4. 7^2

7×7

49

5. 6^3

$6 \times 6 \times 6$

216

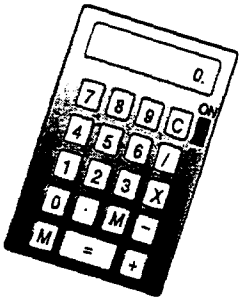
6. 5^3

$5 \times 5 \times 5$

125

Name _____

Exponent Extravaganza



Fill in the chart. Use a calculator.

	Base	Exponent	Multiplication (Factor Form)	Value
9^3				
6^4				
3^3				
8^4				
4^5				
7^3				
5^6				

Write the following using a **base** and an **exponent.**

Example: 3 x 3 x 3 x 3 x 3 3^5

1) 7 x 7 x 7 x 7 x 7 x 7 _____ **2)** 5 x 5 x 5 x 5 x 5 _____

3) 9 x 9 x 9 x 9 x 9 x 9 x 9 _____ **4)** 10 x 10 x 10 x 10 _____

Find the value of the following. Use a calculator.

Example: 4^3	64

5) 5^2 _____ 6) 3^6 _____

7) 10^8 _____ 8) 4^3 _____

9) 6^3 _____ 10) 8^5 _____

11) 10^5 _____ 12) 7^4 _____

Write the multiplication and then find the value of the following.
Use a calculator.

	Multiplication (Factor Form)	Value
Example: $6^2 \times 8$	6 x 6 x 8	288

	Multiplication (Factor Form)	Value
13) $7^2 \times 4$		
14) $2^4 \times 5$		
15) $5^4 \times 3$		
16) $10^4 \times 8$		
17) $6^5 \times 2^2$		

Answer Key
Mult. and Div. - Obj.10

Take Ten

ten	10	10 x 1	10^1
one hundred	100	10 x 10	10^2
one thousand	1,000	10 x 10 x 10	10^3
ten thousand	10,000	10 x 10 x 10 x 10	10^4
one hundred thousand	100,000	10 x 10 x 10 x 10 x 10	10^5
one million	1,000,000	10 x 10 x 10 x 10 x 10 x10	10^6

Exponent Extravaganza

Base	Exponent	Multiplication (Factor Form)	Value
9	3	9x9x9	729
6	4	6x6x6x6	1,296
3	3	3x3x3	27
8	4	8x8x8x8	4,096
4	5	4x4x4x4x4	1,024
7	3	7x7x7	343
5	6	5x5x5x5x5x5	15,625

1) 7^6
2) 5^5
3) 9^7
4) 10^4
5) 25
6) 729
7) 100,000,000
8) 64
9) 216
10) 32,768
11) 100,000
12) 2,401

	Multiplication (Factor Form)	Value
13)	7 x 7 x 4	196
14)	2 x 2 x 2 x 2 x 5	80
15)	5 x 5 x 5 x 5 x 3	1,875
16)	10 x 10 x 10 x 10 x 8	80,000
17)	6 x 6 x 6 x 6 x 6 x 2 x 2	31,104

Objective 11: Use calculators to solve problems multiplying whole numbers.

Vocabulary

even
odd
multiple
product
factor
smallest
greatest
least
digit

Language Foundation

1. All the vocabulary has been taught previously; however, students may have forgotten some of the words. Review if necessary.

2. Remind students that multiples are the same as products. Multiples of 5 are the products when a number is multiplied by 5. (5 Times Table)

Materials

calculators
overhead calculator
ruler
number cubes or number tiles

Transparencies:

Order Counts!

Student Copies:

Identify the Product
Digit Detective
Order Counts!
Multiplication Riddles
Name This Page!

Mathematics Component

1. Review the use of the calculator.
   - Distribute calculators to students. Display the overhead calculator.
   - Review the use of basic keys. (+, -, x, ÷, and =)
   - Ask students to solve the following problems on their calculators. Work the problems on the overhead calculator so students can check their answers.

     36 x 78 = 2,808
     964 x 52 = 50,128
     87 x 43 + 9 = 3,750
     15 x 27 - 35 = 370
     98 x 46 + 18 = 4,526

2. Use calculators to solve multiplication problems.
   - Distribute Identify the Product.
   - Go over the directions with students. Remind them that they need to write both the multiplication problems and the answers to the problems.
   - Point out #1, which is already completed. Ask students to read the description. (largest possible even product) Ask students what type of numbers they need to use to solve the problem. (larger numbers, even numbers) Ask students how they could solve the problem. (Try different numbers until the right ones are found.) This method of problem solving is called guess and check. More information about the guess and check strategy can be found in Vol. 2, Problem Solving, Objective 4.
   - Have students complete the activity sheet using their calculators. Some students might have difficulty with the language. Remind them to underline the important words. For example, in "smallest possible odd product" the most important words are smallest and odd. Some students might have difficulty with the word multiple (#6). Tell them a multiple of 100 is a product in which 100 is one of the factors. (100 x 1 = 100; 100 x 2 = 200; 100 x 3 = 300, etc. 100, 200, 300 are multiples of 100. See Number Concepts and Theory, Objective 10 for further explanation if needed.)
   - After students complete the activity sheet, discuss the answers. Ask students if an even number times an even number always has an even product. (Yes) Ask them if an odd number times an odd number always has an odd product. (Yes) Ask them if the product of an even number times an odd number is even or odd. (Even)

   - Distribute Digit Detective.
   - Go over the directions with students. Tell them they are going to make different combinations with the 4 digits and then solving the problems they make. Remind them they can use a calculator.

- Point out the completed problem. Give students a few minutes to make 3 other problems and products.
- Ask student volunteers to say their problems while you write them on the overhead or board. (There are 12 different combinations possible. All are listed in Answer Key. Students need not come up with all 12, but they should realize that there are more than 4 possible combinations.)
- Direct students to the section of the activity sheet that asks for the greatest product. Ask students how to find the greatest product. (Make the 2 largest possible numbers with the 4 digits and multiply them.)
- Ask students how to arrange the digits to make the largest possible numbers. (Use the highest value digits in the tens place.) Point out the hint on the activity sheet if necessary.
- Ask students what problem would make the greatest product. (Answers will vary but should include 83 x 62 and 63 x 82.) Write their responses on the overhead or the board. Most students will not be able to tell which of the products is higher without doing the calculations.
- Ask students how to find the greatest product. (Try the different multiplication problems until they find the one with the greatest product.) Have students do the calculations on their calculators. Ask a student volunteer to give the answer. (63 x 82 = 5,166 is greater than 83 x 62 = 5,146.) Have students put the correct response (63 x 82 = 5,166) on their activity sheet.
- Ask students what the next problem is on the activity sheet. (Write the problem with the least product.) Ask students how to find the least product. (Make the 2 smallest possible numbers with the 4 digits and multiply them.)
- Ask students how to arrange the digits into the smallest possible numbers. (Use the digits with the smallest value in the tens place.) Point out the hint on the activity sheet if necessary.
- Ask students what problem would make the least product. (Answers will vary but should include 26 x 38 and 36 x 28.) Write their responses on the overhead or the board. Most students will not be able to tell which of the products is less without doing the calculations.
- Have students do the calculations. Ask a student volunteer to give the answer. (26 x 38 = 988 is less than 36 x 28 = 1,008.) Direct the students to put the correct response (26 x 38 = 988) on their activity sheet.
- Have students complete page 2 of Digit Detective.

- Display transparency of Order Counts!.
- Explain rules to students. (See Order Counts! Teacher Directions for Game.)
- If you have blank number cubes, label the sides with the digits 0 - 5 on 2 number cubes and 4 - 9 on 2 other number cubes. If you do not have blank number cubes, use number tiles (template enclosed at end of the lesson). Copy each set of the 4 sets of number tiles on a different color of paper. (You will need 4 different colors of paper.) Cut apart the number tiles. Put each set (set should be the same color) of number tiles in a different paper bag. Have the players draw 1 number tile out of each bag for each turn. Make sure the players return the number tiles to the

correct bag before the next player takes his/her turn.

- Tell students you are going to be Player 1 and the class will be Player 2. Play a game with the class, modeling your thinking out loud as you make the numbers, find the products and decide where to place products on gameboard. Have students (as Player 2) take turns rolling the number cubes and using the calculator to find the products. Let students discuss their answers and decide together which square is best to write their product in. Discuss strategies for winning the game as you play .
- Have students play Order Counts! with a partner.

- Distribute Multiplication Riddles. Tell students that they can find the answers to the riddles using the given clues and a calculator.
- Tell students the class will do the first riddle together and then they will work with partners to finish the activity page.
- Have a student volunteer read the first riddle out loud. Ask students what we are trying to find. (2 two-digit numbers)
- Ask students what information is given. (If the 2 two-digit numbers are multiplied and 4 is added to the answer, the total is 160.)
- Tell students to copy the computation as you do it so they will have a model to follow for the rest of the problems. As you are doing the problem, remind them what they need to copy. (in **bold** type below)
- Tell students you will think out loud as you do the problem. Say the following as you write the computation on the overhead or the board. You might have a student volunteer do the calculations on a calculator.

"I need to find the product of two numbers. I am given the total of 160. Do the 2 numbers have a product of 160? (No) How can I find the number that is the product of the 2 numbers I am trying to find? (Subtract 4 from 160 because I need to do the opposite of addition.)

160 - 4 = 156

156 is the product of the 2 numbers I am trying to find.

I will use estimation to find approximately what the numbers are. I am looking for 2-digit numbers so I need to use 2-digit numbers in my estimation.

10 x 10 = 100

20 x 20 = 400

The numbers I am looking for are between 10 and 20.

Are the numbers closer to 10 or closer to 20? (The numbers are closer to 10 since 100 is closer to 156 than 400 is.)

Now I will use guess and check and the calculator to solve the problem.

What is the number I want for the product? (156)

I will try 11 x 12. **11 x 12 = 132**. The product is too small; the factors need to be larger.
Maybe 11 x 13 will work. **11 x 13 = 143**. The product still is not large enough.
Now I will try 14 x 13. **14 x 13 = 182**. The product is too large; the factors need to be smaller.
What factors might give me the product of 156? I know 11 x 13 is too small and 13 x 14 is too large. The riddle says 2 two-digit numbers so that makes me think the numbers couldn't be the same like 13 and 13. What do you think the two factors are? (Let the students speculate until someone suggests the correct numbers, 13 & 12.)
13 x 12 = 156
What are the 2 two-digit factors that will solve the riddle for #1? (13 & 12)
How will I check to see if the answer is correct? (Use the answer in the original riddle and see if you get the total of 160.)
13 x 12 + 4 = 160 so the answer is correct."

- Instruct students to put the answer to #1 (13 & 12) on the activity page in the blanks provided.
- Assign partners and have students complete the activity page. Remind them to check every answer by using the answer in the riddle to see if the total is the same.

- Distribute Name This Page! Go over the directions with students. Demonstrate how to line the ruler up between the middle of the box and the middle of the circle when connecting them. Point out the blanks at the bottom of the page where the letters are to be placed. Have students complete the activity page.

Name _____

Identify the Product

Use the six numbers below to find multiplication problems and the answers that fit the description. Use a calculator.
The first one is done for you as an example.

25	13	48	36	27	18

1) **48 x 36 = 1,726**
largest possible even product

2) _____
smallest possible even product

3) _____
largest possible odd product

4) _____
smallest possible odd product

5) _____
even product between 800 & 900

6) _____
4-digit product that's a multiple of 100

Use the seven numbers below to find multiplication problems and the answers that fit the description. Use a calculator.

49	67	98	22	34	17	56

7) _____
largest possible odd product

8) _____
largest possible even product

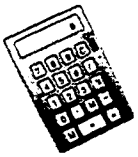
9) _____
smallest possible even product

10) _____
smallest possible odd product

11) _____
even product between 1,900 & 2,000

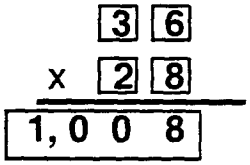
12) _____
even product between 1,200 & 1,250

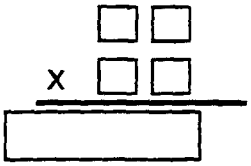
Name _____

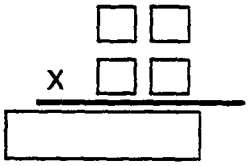


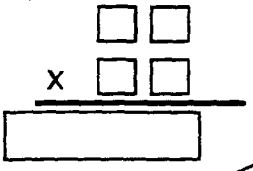
Digit Detective

Use the digits **2, 3, 6, and 8** to write 2-digit numbers in the squares. ☐
Use each digit only once.
Write the product in the rectangle. ▭

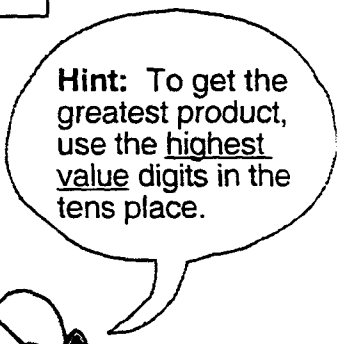




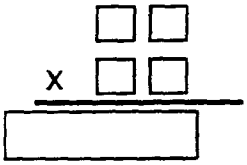




Write the problem with the **greatest product**.

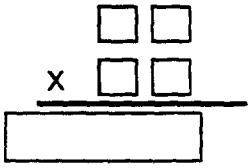


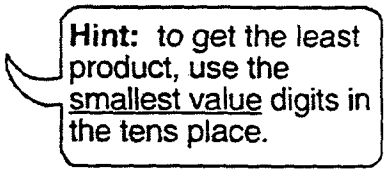
greatest product ⟶



Write the problem with the **least product**.

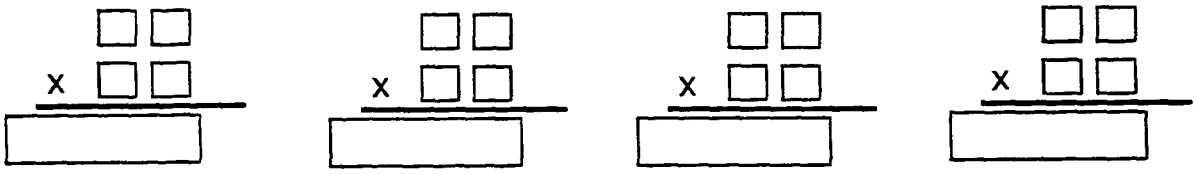
least product ⟶

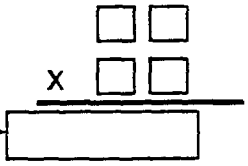


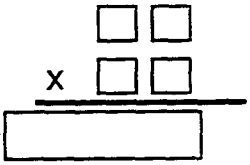


Make 2-digit numbers with the digits below.
Use each digit only once.
Find the problem with the **greatest product** and the **least product**.

1) 1, 3, 6, 7



greatest product → 

least product → 

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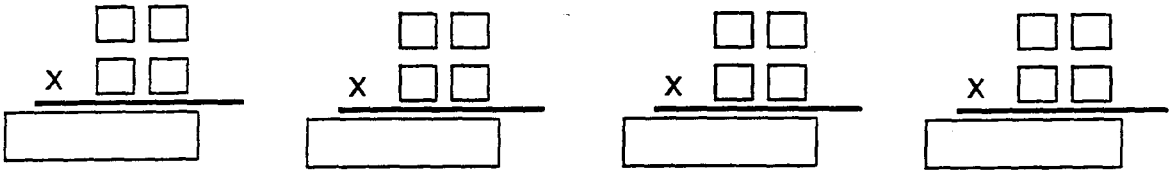
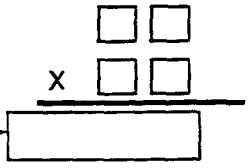
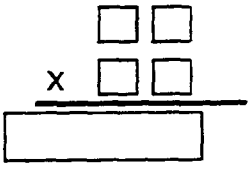
2) 4, 5, 6, 9



greatest product → 

least product → 

Order Counts!
Teacher Directions for the Game

Materials:

calculator
2 number cubes labeled 0 - 5 or 2 sets of number tiles 0 - 5
2 number cubes labeled 4 - 9 or 2 sets of number tiles 4 - 9
4 paper bags if using number tiles

Object of the Game:

Be the first player to fill all spaces on his/her gameboard with the numbers in order.
Player 1 - The **product** of all **Player 1's** numbers must be **less than 4,500**.
Player 2 - The **product** of all **Player 2's** numbers must be **more than 4,500**.

Rules:

1. Choose one player to go first.
2. Player 1 tosses all four number cubes.
   - Use all four numbers on the cubes to form two 2-digit numbers. (For example, if 3, 4, 6, & 9 were rolled, the numbers might be 49 and 36.)
   - Estimate the product to make sure the product is less than 4,500. (Estimate is 50 x 40 which is 2,000.)
   - Use the calculator to find the product. (1,764)
   - Player 1's products must be in order from space 1 to space 5.
   - Write the product in any of the five spaces on the gameboard marked Player 1. (Product should be written in box 2 as it is on the low side of 4,500. Player needs to leave room in boxes 3-5 for larger products.)
3. Player 2 tosses all four number cubes.
   - Use all four numbers on the cubes to form two 2-digit numbers.
   - Estimate the product to make sure the product is more than 4,500.
   - Use the calculator to find the product.
   - Player 2's products must be in order from space 1 to space 5.
   - Write the product in any of the five spaces on the gameboard marked Player 2.
4. A player may pass on any turn if the product does not fit in order on his/her gameboard.
5. Make sure the products are in correct order!
6. The first player to fill all the spaces on his/her side of the gameboard wins.

Order Counts!
Gameboard

PLAYER 1 **< 4,500**

1	2	3	4	5	**4,500**

Smaller ⟶ **Larger**

PLAYER 2 **> 4,500**

4,500	1	2	3	4	5

Smaller ⟶ **Larger**

Name _____

Multiplication Riddles

? ? ?
? ? ?

1) If you multiply **two 2-digit** numbers and add 4 to the product, the total is 160. What numbers are we? __ __ x __ __ + 4 = 160	2) If you multiply **two 2-digit** numbers and add 12 to the product, the total is 300. What numbers are we? __ __ x __ __ + 12 = 300
3) If you multiply **two 2-digit** numbers and add 4 to the product, the total is 400. What numbers are we? __ __ x __ __ + 4 = 400	4) If you use **one 1-digit** number as a factor **3** times and add 16 to the product, the total is 80. What number am I? __ x __ x __ + 16 = 80
5) If you use **one 1-digit** number as a factor **4** times and add 19 to the product, the total is 100. What number am I? __ x __ x __ x __ + 19 = 100	6) If you multiply **two 2-digit** numbers and subtract 25 from the product, the total is 375. What numbers are we? __ __ x __ __ - 25 = 375

Name _____

Name This Page! ? ? ? ? ? ? ? ? ? ? ?

Use a calculator to find each product. Write the product in the box.
Use a ruler to draw a line between the box and the circle with the matching product.
Copy the letter that the line crosses into the spaces below.
The letters will form two words that are the title for this activity page.

1. 806 x 270 = ☐
2. 681 x 515 = ☐
3. 132 x 418 = ☐
4. 427 x 150 = ☐
5. 269 x 435 = ☐
6. 549 x 308 = ☐
7. 271 x 437 = ☐
8. 706 x 403 = ☐
9. 357 x 459 = ☐
10. 891 x 624 = ☐
11. 628 x 144 = ☐

K R O C D E F A N I T D S U R

117,015
169,092
55,176
217,620
350,715
284,518
64,050
555,984
163,863
90,432
118,427

P _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

1 2 3 4 5 6 7 8 9 10 11

Digit Tiles Template for Order Counts!

0	1	2	3	4	5

0	1	2	3	4	5

4	5	6	7	8	9

4	5	6	7	8	9

Answer Key
Mult. & Div. - Obj. 11

Identify the Product

1) 48 x 36 = 1,726
2) 18 x 13 = 234
3) 27 x 25 = 675
4) 25 x 13 = 325
5) 48 x 18 = 864
6) 48 x 25 = 1,200
7) 49 x 67 = 3,283
8) 98 x 67 = 6,566
9) 22 x 17 = 374
10) 49 x 17 = 833
11) 34 x 56 = 1,904
12) 56 x 22 = 1,232

Digit Detective All possible answers are given.

36 x 28 = 1,008	63 x 28 = 1,764	63 x 82 = 5,166	36 x 82 = 2,952
23 x 68 = 1,564	86 x 23 = 1,978	32 x 68 = 2,176	32 x 86 = 2,752
26 x 38 = 988	26 x 83 = 2,158	62 x 83 = 5,146	62 x 38 = 2,356

greatest product 63 x 82 = 5,166

least product 26 x 38 = 988

1)

13 x 67 = 871	13 x 76 = 988	31 x 67 = 2,077	31 x 76 = 2,356
16 x 37 = 592	16 x 73 = 1,168	61 x 73 = 4,453	61 x 37 = 2,257
17 x 36 = 612	17 x 63 = 1,071	71 x 63 = 4,473	71 x 36 = 2,556

greatest product 71 x 63 = 4,473

least product 16 x 37 = 592

2)

45 x 96 = 4,320	45 x 69 = 3,105	54 x 69 = 3,726	54 x 96 = 5,184
46 x 59 = 2,714	46 x 95 = 4,370	59 x 64 = 3,776	95 x 64 = 6,080
49 x 56 = 2,744	49 x 65 = 3,185	94 x 56 = 5,264	94 x 65 = 6,110

greatest product 94 x 65 = 6,110

least product 46 x 59 = 2,714

Multiplication Riddles

1) 13 12
2) 18 16
3) 21 19
4) 4
5) 3
6) 13 15

Name This Page!

1) 217,620
2) 350,715
3) 55,176
4) 64,050
5) 117,015
6) 169,092
7) 118,427
8) 284,518
9) 163,863
10) 555,984
11) 90,432

PRODUCT FIND

Objective 12: Model and write division situations (1-digit and 2-digit numbers by 1-digit numbers) with and without remainders.

Vocabulary

fact family
left over
remainder
quotient
dividend
divisor
capitalize

Materials

overhead counters
student counters (25 per student)

Transparencies:

- Division I
- Division II
- Reading
- Reading Practice

Student Copies:

- Division Practice
- More Practice with Division
- Let's Read
- Remaining Numbers
- Division, Division, Division!

Language Foundation

1. Remind students that **fact families** are all the basic facts that can be made with three numbers and an operation. For example, with 45, 9, 5 the following related number sentences can be formed:

   $45 \div 9 = 5$ $45 \div 5 = 9$
   $9 \times 5 = 45$ $5 \times 9 = 45$

2. Point out to students that **left over** and **remainder** are synonyms. Explain to students that sometimes when you finish a meal there is food that has not been eaten. If that food is eaten the next day, we call it leftovers. In division, when we form equal groups, sometimes there are extra numbers that are left over.

3. Write " B" and "b" on the board or overhead. Ask student s if they can explain the difference between these two letters. (one is big, one is small; one is larger than the other, etc.) Tell students the "B" is a capital letter and "b" is a small letter. To **capitalize** "b", change it to "B". Ask students to capitalize several other letters such as "g" to "G"; "t" to "T", etc. Point out that capital letters are frequently used in Geometry, while small letters are frequently used in Algebra.

4. Review with students the symbols used to represent division.

   Have students share the symbols they use in their country. For example, in some Central American countries a reverse symbol might be used.

Mathematics Component

Note: Students were introduced to division as the inverse operation of multiplication in Mult. and Div. Objective 1. You might need to refer back to that lesson and remind students of the connection between multiplication and division (fact families) as you work on this lesson.

1. Review basic division.
   - Put 10 transparent counters on the overhead.
   - Ask a student volunteer to divide the counters into equal groups of 2 counters. (5 groups)
   - Ask students what operation was used. (division) Tell students that division is used to make equal (the same size) groups.
   - Ask a student volunteer to write the division problem on the overhead that represents the 10 counters divided into equal groups of 2 counters. Remind students that there are 2 ways to write a division problem. Ask another student volunteer to write the other form on the overhead so both ways are visible to students.

$$2\overline{)10}^{\,5} \qquad 10 \div 2 = 5$$

   - Read both problems out loud as you point to the corresponding numbers. Point out the 2 different ways to make the division sign. (⟌ and ÷)
   - Push together the 10 counters on the overhead.
   - Ask a student volunteer to divide the 10 counters into equal groups of 5 counters. (2 groups)
   - Ask students what operation was used. (division)
   - Ask a student volunteer to write the division problem on the overhead that represents the 10 counters divided into equal groups with 5 counters in a group. Both formats should be written.

$$5\overline{)10}^{\,2} \qquad 10 \div 5 = 2$$

   - Point to $10 \div 2 = 5$ and $10 \div 5 = 2$. Ask students what is the same about these 2 problems. (both problems use the numbers 10, 5, and 2.) Ask the students what 10, 5, and 2 make? (a fact family) Tell students these division problems are part of the same fact family. They should remember this term from earlier lessons.
   - Write on the overhead.

Fact Family 10, 5, 2

$10 \div 2 = 5$ $\qquad$ $10 \div 5 = 2$

$2 \times 5 = 10$ $\qquad$ $5 \times 2 = 10$

   - Ask students if they remember any other fact families. If needed, write $12 \div 3 = 4$ on the board. Have students tell you the rest of the facts that go with the fact family as you write them on the overhead. ($3 \times 4 = 12$; $12 \div 4 = 3$; $4 \times 3 = 12$)
   - Do a few more examples of fact families on the overhead to reinforce the inverse relationship between multiplication and division.

- Tell students that there are 2 reasons to divide. One reason to divide is to find equal groups and the other reason to divide is to find the number in each group. The same problem may be used to demonstrate both reasons.
- Display Division I transparency. Tell students that this transparency is an example of dividing to make equal groups. Read the transparency out loud as you point to what is being described. Circle the horizontal groups of 3 with an overhead pen to make them stand out to the students. Point out to students that the circled groups of 3 represent the number you are dividing by. Point out the 3 in the division problem.
- Display Division II transparency. Tell students that this transparency is an example of dividing to find the number in a group. Read the transparency out loud as you point to what is being described. Circle the vertical groups of 5 with an overhead pen to make them stand out to the students. Point out to students that the 3 circles at the bottom of the page represent the number you are dividing by. Point out the 3 in the division problem.
- Distribute Division Practice. Go over the example. Have students complete the activity page. Go over the answers with students. Have student volunteers draw the models on the overhead. The models may vary depending on the way the student looks at the problem. (16 ÷ 2 could be represented as 8 groups of 2 or 2 groups of 8.)
- Distribute More Practice with Division. Some students may need to draw pictures or use counters to complete the problems. Remind students that multiplication is the opposite of division. If they are having difficulty with the division, tell them to think of the related fact to get the answer. For example; if students can't figure out 14 ÷ 2, tell them to think 2 x ? = 14.

2. Read division problems.
   - Remind students that the parts of a division problem have special names. Write **dividend, divisor, and quotient** on the overhead.
   - If students have difficulty remembering the language, show a transparency of All About Division (Mult. and Div. Objective 1) for review.
   - Write $10 \div 2 = 5$ and $2\overline{)10}^{\,5}$ on the overhead.
   - Point to the 5. Ask students what is the name for the answer in a division problem. (quotient) Have students repeat quotient as you point to the 5. Point out the location of the quotient in both problems.
   - Point to the 10. Ask students what is the name of the number that is being divided. (dividend) Have students repeat the word dividend as you point to the 10. Point out the location of the dividend in both problems.
   - Point to the 2. Ask students what is the name of the number used to divide. (divisor) Have students repeat the word divisor as you point to the 2. Point out the location of the divisor in both problems.
   - Display Reading transparency. Use a cover sheet so only the first 2 lines are showing. Point to

the corresponding part of the problem as you say, "12 ÷ 3 = 4." Have students repeat as you point to each part of the problem.

- Uncover the arrows and the following line. Point to the corresponding part of the problem as you say, "dividend divided by divisor equals quotient." Have students repeat as you point to each part of the problem.
- Uncover the next 2 lines of the transparency. Point to the corresponding part of the problem as you say, "12 ÷ 3 = 4." Have students repeat as you point to each part of the problem.
- Uncover the last line on the transparency. Point to the corresponding part of the problem as you say, "dividend divided by divisor equals quotient." Have students repeat as you point to each part of the problem.
- Display Reading Practice transparency.
- Ask student volunteers to read each problem out loud. Have the rest of the class listen carefully. After each problem is read, have students indicate by thumbs up or thumbs down whether they agree the problem was read correctly.
- Ask students to identify the dividend, divisor and quotient on random problems. For example, ask a student to point to the quotient on #1, ask another student to identify the dividend on # 2, etc.
- You may want to give a copy of the Reading transparency to the students to keep in their notebooks for future reference if they are having difficulty with the language.
- Distribute Let's Read. Go over the directions with students. Have students complete the activity page.

3. Divide with remainders.
   - Distribute 25 counters to each student.
   - Put 7 transparent counters on the overhead. Ask students to select 7 counters and separate them from the rest of their counters.
   - Tell students that the 7 counters need to be divided into groups of 2 counters per group. Ask students how to write this division problem. ($2\overline{)7}$ or 7 ÷ 2) Write the problem on the overhead using the format with the division bar. (⌐‾)
   - Tell students to divide their counters into groups of 2. Ask students how many counters are in each group? (2) Say to students as you arrange the overhead counters into groups of 2, "I can make 3 groups of 2 counters in each group. I have 1 counter left over. I can't make another group of 2. What should I do with the leftover counter?" Let students speculate.
   - Tell students that sometimes division does not always end up with equal groups; sometimes there are some left over. These leftover counters or numbers are called the **remainder**. Have students repeat the word remainder several times. In this problem, the **remainder is 1** because there is 1 counter left over or remaining after the 7 counters are divided into groups of 2.
   - On the overhead, write the answer. Say, "7 divided by 2 equals 3 remainder 1. The **R** stands for **remainder**." The **R** is usually capitalized.

$$2\overline{)7}\quad 3\ R\,1$$

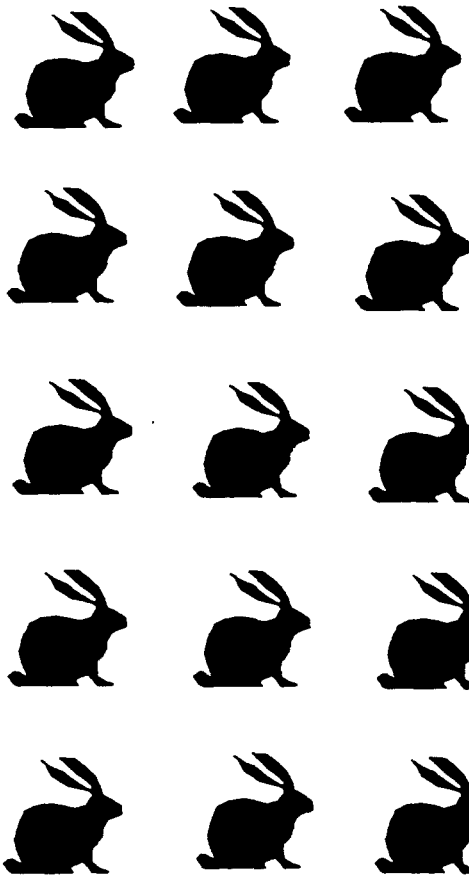
- Display 14 counters on the overhead. Have students make a group of 14 counters on their desk.
- Tell students that you want to divide the 14 counters into groups of 4 each. Ask them how to write the division problem. ($4\overline{)14}$ or $14 \div 4$) Tell students when working with division problems that may have remainders, it is easier to write the problem in the format using the division bar so the division bar format will be used from now on when solving division problems. Write $4\overline{)14}$ on the overhead.
- Tell students to work with their counters to solve the problem. Ask a student volunteer for the answer. (3 R 2) Move the overhead counters to show 3 groups of 4 each and the 2 remaining counters. Say as you write the quotient on the overhead, "14 divided by 4 equals 3 remainder 2."

$$4\overline{)14}\quad 3\text{ R }2$$

- Do a few more examples ($17 \div 5$, $13 \div 2$, $19 \div 3$, $23 \div 6$) with students. Have them work the problems at their desks with the counters as you record the problem and the answers on the overhead. Make sure the division problem is written using the division bar format. Have students practice saying the word **remainder** as they give the answer. Have student volunteers write the answers on the overhead to give them practice writing the correct format.
- Distribute Remaining Numbers to students. Go over the directions. Have students complete the activity page.
- Division, Division, Division is included for further practice. Some students might need to use counters or draw pictures to solve the problems.

DIVISION I

Making Equal Groups



15 rabbits in all.

3 rabbits in each group.

How many groups?

$15 \div 3 = 5$ or $3\overline{)15}^{\,5}$

There are 5 groups.

DIVISION II

Finding Number in Group

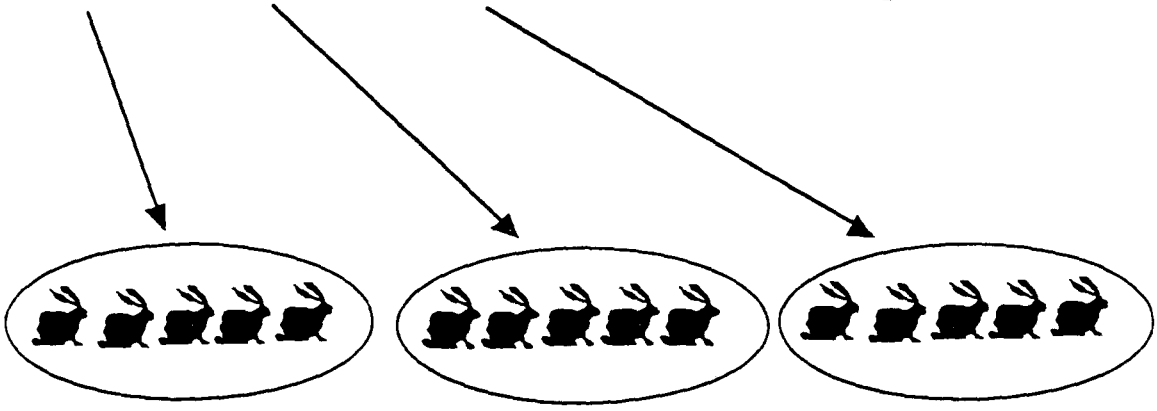
15 rabbits in all.

Put rabbits into 3 equal groups.

How many rabbits are in each group?

$15 \div 3 = 5$ or $3\overline{)15}^{\,5}$

There are 5 rabbits in each group.



Name _____

Division Practice

Draw a picture to model each division problem.

Example: 12÷ 2 = 6 

1) $9 \div 3 = 3$

2) $18 \div 3 = 6$

3) $24 \div 8 = 3$

4) $24 \div 6 = 4$

5) $3\overline{)27}$ $\quad 9$

6) $5\overline{)25}$ $\quad 5$

7) $4\overline{)24}$ $\quad 6$

8) $5\overline{)35}$ $\quad 7$

Name _____

More Practice with Division

Remember:
Total number 18
divided by
number in each group 6
equals
how many groups. 3

$$6\overline{)18}\quad 3$$

$18 \div 6 = 3$

Find the **quotient.**
Draw a picture or use counters if needed.

1) $6 \div 3 =$

2) $14 \div 2 =$

3) $2\overline{)18}$

4) $3\overline{)27}$

5) $5\overline{)35}$

6) $4\overline{)20}$

7) $12 \div 4 =$

8) $21 \div 3 =$

9) $27 \div 9 =$

10) $36 \div 4 =$

11) $4\overline{)32}$

12) $5\overline{)40}$

13) $6\overline{)36}$

14) $3\overline{)24}$

15) $20 \div 5 =$

16) $24 \div 6 =$

Reading

Read: 12 divided by 3 equals 4

$$\underset{\text{dividend}}{12} \quad \underset{\text{divided by}}{\div} \quad \underset{\text{divisor}}{3} \quad \underset{\text{equals}}{=} \quad \underset{\text{quotient}}{4}$$

Read: 12 divided by 3 equals 4

$$3\overline{)12}\,4$$

$$\underset{\text{divisor}}{3}\overline{)\underset{\text{dividend}}{12}}\,\underset{\text{quotient}}{4}$$

Reading Practice

Read each problem out loud.

1) $18 \div 2 = 9$

2) $8\overline{)16}$ $\quad 2$

3) $24 \div 3 = 8$

4) $4\overline{)28}$ $\quad 7$

5) $9\overline{)54}$ $\quad 6$

6) $15 \div 5 = 3$

7) $4\overline{)16}$ $\quad 4$

8) $12 \div 4 = 3$

9) $18 \div 3 = 6$

10) $6\overline{)18}$ $\quad 3$

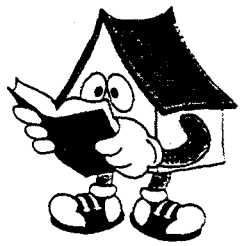
11) $30 \div 6 = 5$

12) $3\overline{)24}$ $\quad 8$

Dividend Divisor Quotient

Name _____

Let's Read



Fill in the blanks with the correct number.

1) $14 \div 2 = 7$ means ____ divided by __2__ equals ____ .

2) $24 \div 3 = 8$ means ____ divided by ____ equals ____ .

3) $6 \div 3 = 2$ means ____ divided by ____ equals ____ .

4) $18 \div 6 = 3$ means ____ divided by ____ equals ____ .

5) $2\overline{)16}^{\,8}$ means ____ divided by __2__ equals ____.

6) $5\overline{)10}^{\,2}$ means ____ divided by ____ equals ____.

7) $1\overline{)3}^{\,3}$ means ____ divided by ____ equals ____ .

8) $9\overline{)27}^{\,3}$ means ____ divided by ____ equals ____ .

9) $6\overline{)30}^{\,5}$ means ____ divided by ____ equals ____ .

10) In $4\overline{)32}^{\,8}$, the divisor is ____, the dividend is ____, and the quotient is ____ .

11) In $2\overline{)12}^{\,6}$, the divisor is ____, the dividend is ____, and the quotient is ____ .

12) In $28 \div 4 = 7$, the divisor is ____, the dividend is ____, and the quotient is ____ .

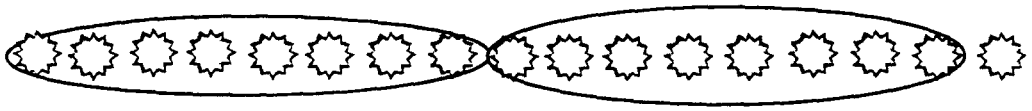
13) In $36 \div 9 = 4$, the divisor is ____, the dividend is ____, and the quotient is ____.

Name _____

Remaining Numbers

Use the following models to solve the division problems.
Circle the equal groups.
Write the quotient, including the remainder, in the problem..

Example:



$$8\overline{)17} \quad 2\text{ R }1$$

1) 

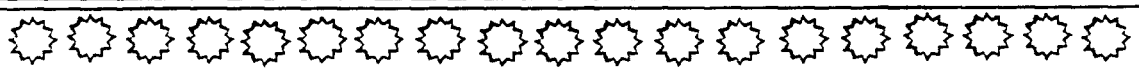
$$5\overline{)18} \quad \text{R}$$

2) 

$$9\overline{)20} \quad \text{R}$$

3) 

$$7\overline{)13} \quad \text{R}$$

4) 

$$4\overline{)19} \quad \text{R}$$

5) 

$$3\overline{)16} \quad \text{R}$$

Draw a picture to model each division problem.
Solve the problem and write the quotient in the correct place.

6) $2\overline{)19}$

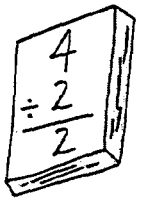
7) $6\overline{)21}$

8) $3\overline{)17}$

9) $4\overline{)23}$

10) $7\overline{)18}$

Name _____



Division, Division, Division!

Find the quotient.
Some quotients might include remainders.
Draw a picture or use counters if needed.

1. $8 \div 2 =$

2. $16 \div 4 =$

3. $5\overline{)7}$

4. $9\overline{)18}$

5. $6\overline{)31}$

6. $8\overline{)23}$

7. $6\overline{)18}$

8. $7\overline{)31}$

9. $4\overline{)34}$

10. $3\overline{)21}$

11. $7\overline{)28}$

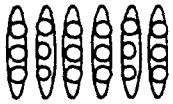
12. $5\overline{)27}$

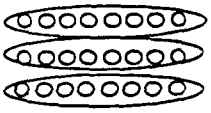
Answer Key
Mult. and Div. - Obj.12

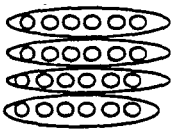
Division Practice

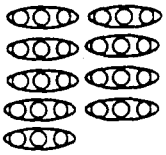
Pictures will vary. Possible answers given.

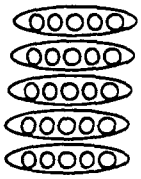
1) 

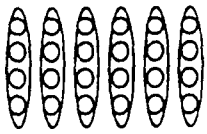
2) 

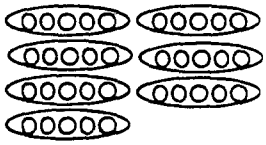
3) 

4) 

5) 

6) 

7) 

8) 

More Practice with Division

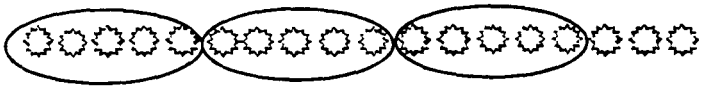
1) 2
2) 7
3) 9
4) 9
5) 7
6) 5
7) 3
8) 7
9) 3
10) 9
11) 8
12) 8
13) 6
14) 8
15) 4
16) 4

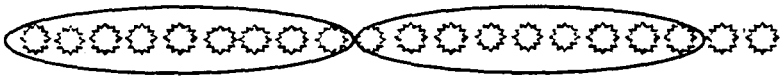
Let's Read

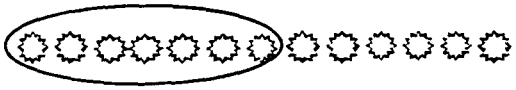
1) 14 7	2) 24 3 8	3) 6 3 2
4) 18 6 3	5) 16 8	6) 10 5 2
7) 3 1 3	8) 27 9 3	9) 30 6 5
10) 4 32 8	11) 2 12 6	12) 4 28 7
13) 9 36 4		

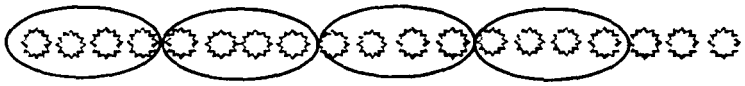
Remaining Numbers

Circled groups may vary. One possible representation is given.

1)  3 R3

2)  2 R2

3)  1 R6

4)  4 R3

5)  5 R1

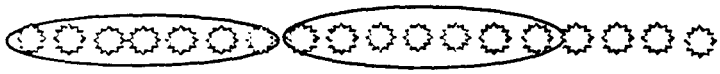
Pictures will vary. One possible picture is given.

6)  9 R1

7)  3 R3

8)  5 R2

9)  5 R3

10)  2 R4

Division, Division, Division

1) 4
2) 4
3) 1 R2
4) 2
5) 5 R1
6) 2 R7
7) 3
8) 4 R3
9) 8 R2
10) 7
11) 4
12) 5 R2

Objective 13: Mentally divide by 1-digit numbers and multiples of 10. Recognize patterns in division.

Vocabulary

quotient
pattern
dividend
divisor
division bar
)‾‾

Materials

calculator

Transparencies:

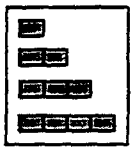
- Patterns of Division
- Patterns of Division II
- Patterns of Division III
- Mental Math / Division
- Mental Math / Division Practice

Student Copies:

- Patterns Practice
- Mental Math / Division
- Practicing Mental Math / Division

Language Foundation

1. Discuss the word **pattern** with students. Tell students that patterns are formed when shapes, designs, or numbers are repeated in a certain order. Show students the following examples and have them describe the pattern.



1 2 3 1 2 3 1. .

70
700
7,000

Ask students to create some patterns of their own to share with the class. Students should be aware that patterns occur regularly in math with numbers and geometric shapes.

Mathematics Component

1. Recognize patterns in division with 1-digit divisor.
   - Distribute calculators to students.
   - Display Patterns of Division transparency. Use a cover sheet so only the first problem (6 ÷ 3) is showing.
   - Ask students the **quotient** of 6 ÷ 3. (2) Write 2 in the answer space.
   - Uncover 60 ÷ 3. Tell students to use their calculators to find the quotient. (20) Write 20 in the answer space.
   - Continue in this way for the next 3 problems. (600 ÷ 3 = 200; 6,000 ÷ 3 = 2,000; 60,000 ÷ 3 = 20,000)
   - Ask students if they see a **pattern** in the quotients. (Each quotient has a 2 since 6 ÷ 3 = 2. There are zeros in each quotient equal to the number of zeros in the **dividend**.)
   - Uncover 15 ÷ 3. Ask students the quotient. (5) Write 5 in the answer space.
   - Uncover 150 ÷ 3. Tell students to use their calculators to find the quotient. (50) Write 50 in the answer space.
   - Continue in this way for the next 3 problems. (1,500 ÷ 3 = 500; 15,000 ÷ 3 = 5,000; 150,000 ÷ 3 = 50,000)
   - Ask students if they see a pattern in the quotients. (Each quotient begins with a 5 since 15 ÷ 3 = 5. There are zeros in each quotient equal to the number of zeros in the dividend.)
   - Complete the last box in the same manner as the other 2 boxes. Some students may be able to do the computation without their calculators at this point. If not, let them use their calculators. Make sure students see the connection between the number of zeros in the dividend and the number of zeros in the quotient. In the problems using the **division bar**, emphasize the placement of the quotient. The answer to the basic fact needs to be placed directly above the lowest place value of the basic fact in the dividend, and the zero(s) needs to be directly above the zero(s) in the dividend. See examples below.

$$4\overline{)28}\quad 7 \qquad 4\overline{)280}\quad 70 \qquad 4\overline{)2{,}800}\quad 700$$

   - Display the transparency Patterns of Division II. Use a cover sheet so only the first box shows. Tell students calculators are not to be used during this part of the activity.
   - Ask students the quotient of 9 ÷ 3 (3) Write 3 in the answer space.
   - Ask students the quotient of 90 ÷ 3. (30) Write 30 in the answer space. Remind students that first the basic fact problem is solved (9 is divided by 3) and then you add zeros to equal the number of zeros in the dividend.
   - Finish the first box, asking students the quotients and how they got the quotients. Emphasize the pattern and the process of mental math.
   - Work together as a class to finish the other two boxes on the transparency. Write all quotients in the correct answer spaces.

- *Reinforce the pattern by going over each box and emphasizing the solving of the* basic fact and then the placing of zeros. *The number of zeros in the quotient should equal the number of zeros in the dividend since every* **divisor** only has 1 digit. In the problems using the division bar, emphasize the placement of the quotient. The answer to the basic fact needs to be directly above the lowest place value of the basic fact in the dividend and the zero(s) needs to be directly above the zero(s) in the dividend. See examples below.

$$5\overline{)25}\quad 5 \qquad 5\overline{)250}\quad 50 \qquad 5\overline{)2{,}500}\quad 500$$

- Distribute Patterns Practice. Go over the directions with students. Have students complete the activity sheet.

2. Use basic facts, patterns and mental math to find quotients with 2-digit divisors.
   - Distribute calculators to students.
   - Display the transparency Patterns of Division III. Use a cover sheet so only the first problem (240 ÷ 60) shows.
   - Tell students to use their calculators to find the quotient of 240 ÷ 60. (4) Write 4 in the answer space.
   - Uncover 2,400 ÷ 60. Tell students to use their calculators to find the quotient. (40) Write 40 in the answer space.
   - Uncover 24,000 ÷ 60. Tell students to use their calculators to find the quotient. (400) Write 400 in the answer space.
   - Uncover 240,000 ÷ 60. Tell students to use their calculators to find the quotient. (4,000) Write 4,000 in the answer space.
   - Ask students if they see a **pattern** in the quotients. (Each quotient begins with 4. The number of zeros in the quotient is 1 less than the number of zeros in the dividend.)
   - Uncover 360 ÷ 40. Tell students to use their calculators to find the quotient. (90) Write 90 in the answer space.
   - Uncover 3,600 ÷ 40. Tell students to use their calculators to find the quotient. (900) Write 900 in the answer space.
   - Uncover 36,000 ÷ 40. Tell students to use their calculators to find the quotient. (9,000) Write 9,000 in the answer space.
   - Uncover 360,000 ÷ 40. Tell students to use their calculators to find the quotient. (90,000) Write 90,000 in the answer space.
   - Ask students if they see a pattern in the quotients. (Each quotient begins with a 9. The number of zeros in the quotient is 1 less than the number of zeros in the dividend.)
   - Complete the next box, one problem at a time. Some students may be able to do the computation without their calculators at this point. If not, let them use their calculators. Make sure students see the connection between the number of zeros in the dividend and the number of zeros in the quotient. In the problems using the **division bar**, emphasize the correct placement of the quotient.

- Display the transparency Mental Math/Division. Use a cover sheet to expose only one step at a time as you explain the process.
- Go over the 2 examples at the bottom of the page. Emphasize the following steps:
    1. Solve the basic fact.
    2. Cross out an equal number of zeros from the dividend and the divisor.
    3. Place any remaining zeros in the quotient.
- Students may be given a copy of Mental Math/Division to keep in their notebooks for further reference.
- Display the transparency Mental Math/Division Practice. Use a cover sheet so only the first problem shows. Tell students calculators are not to be used during this part of the activity.
- Ask students the quotient of 540 ÷ 90. (6) Have a student explain how he/she solved the problem. Remind students to solve basic fact first, then cross out the equal number of zeros in the dividend and the divisor and place any remaining zeros in the quotient. Make sure students understand the correct placement of the quotient in the problems using the division bar. You might have student volunteers write the answers on the transparency so you can tell if they understand the correct placement of the quotient.
- Solve the remaining problems on the transparency. Record all answers. Have students explain the 3 steps to show how they got their answers.
- Distribute Practicing Mental Math/Division. Go over directions with students. Have students complete page independently.

Patterns of Division

6 ÷ 3 =
60 ÷ 3 =
600 ÷ 3 =
6,000 ÷ 3 =
60,000 ÷ 3 =

15 ÷ 3 =
150 ÷ 3 =
1,500 ÷ 3 =
15,000 ÷ 3 =
150,000 ÷ 3 =

$4\overline{)28}$	$4\overline{)280}$
$4\overline{)2{,}800}$	$4\overline{)28{,}000}$
$4\overline{)280{,}000}$	$4\overline{)2{,}800{,}000}$

Patterns of Division II

9 ÷ 3 =
90 ÷ 3 =
900 ÷ 3 =
9,000 ÷ 3 =
90,000 ÷ 3 =

24 ÷ 4 =
240 ÷ 4 =
2,400 ÷ 4 =
24,000 ÷ 4 =
240,000 ÷ 4 =

$5\overline{)25}$	$5\overline{)250}$
$5\overline{)2{,}500}$	$5\overline{)25{,}000}$
$5\overline{)250{,}000}$	$5\overline{)2{,}500{,}000}$

Name _____

Patterns Practice

Solve the following division problems.
Put the quotient in the correct place in the Place Value Chart.
The first one is done for you.

Problem	Place Value		Ten Thousands	Thousands	Hundreds	Tens	Ones
$4\overline{)8}$	→ 8 ones	÷ 4 =					**2**
$4\overline{)80}$	→ 8 tens	÷ 4 =					
$4\overline{)800}$	→ 8 hundreds	÷ 4 =					
$4\overline{)8{,}000}$	→ 8 thousands	÷ 4 =					
$4\overline{)80{,}000}$	→ 8 ten-thousands	÷ 4 =					

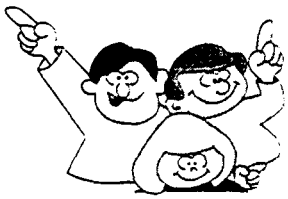
Place Value Chart

Problem	Place Value		Ten Thousands	Thousands	Hundreds	Tens	Ones
$2\overline{)10}$	→ 10 ones	÷ 2 =					
$2\overline{)100}$	→ 10 tens	÷ 2 =					
$2\overline{)1{,}000}$	→ 10 hundreds	÷ 2 =					
$2\overline{)10{,}000}$	→ 10 thousands	÷ 2 =					
$2\overline{)100{,}000}$	→ 10 ten-thousands	÷ 2 =					

Complete the patterns.

$54 \div 6 =$ _____
$540 \div 6 =$ _____
$5{,}400 \div 6 =$ _____
$54{,}000 \div 6 =$ _____
$540{,}000 \div 6 =$ _____

$35 \div 7 =$ _____
$350 \div 7 =$ _____
$3{,}500 \div 7 =$ _____
$35{,}000 \div 7 =$ _____
$350{,}000 \div 7 =$ _____



$56 \div 8 =$ _____
$560 \div 8 =$ _____
$5{,}600 \div 8 =$ _____
$56{,}000 \div 8 =$ _____
$560{,}000 \div 8 =$ _____

$45 \div 5 =$ _____
$450 \div 5 =$ _____
$4{,}500 \div 5 =$ _____
$45{,}000 \div 5 =$ _____
$450{,}000 \div 5 =$ _____

Use mental math to find the quotients.

1) $4{,}800 \div 8 =$ _____

2) $200 \div 5 =$ _____

3) $240{,}000 \div 3 =$ _____

4) $30 \div 6 =$ _____

5) $4{,}200 \div 6 =$ _____

6) $600 \div 3 =$ _____

7) $49{,}000 \div 7 =$ _____

8) $6{,}400 \div 8 =$ _____

9) $7\overline{)280}$

10) $5\overline{)15{,}000}$

11) $6\overline{)240{,}000}$

12) $9\overline{)8{,}100}$

13) $4\overline{)20{,}000}$

14) $6\overline{)360}$

Patterns of Division III

240 ÷ 60 =
2,400 ÷ 60 =
24,000 ÷ 60 =
240,000 ÷ 60 =

360 ÷ 40 =
3,600 ÷ 40 =
36,000 ÷ 40 =
360,000 ÷ 40 =

$70\overline{)420}$	$70\overline{)4{,}200}$
$70\overline{)42{,}000}$	$70\overline{)420{,}000}$

MENTAL MATH/DIVISION

$2{,}800 \div 40$

Here is how to divide quickly in your head.

2800 ÷ **4**0
$28 \div 4 = \mathbf{7}$

1) Look for the basic fact. Divide.

$2{,}800 \div 40$

2) Cross out an equal number of zeros in the dividend and the divisor.

↓

70

3) Place any remaining zeros in the quotient.

More Examples

$32{,}000 \div 80$

$32 \div 8 = \mathbf{4}$

400

$3{,}000 \div 60$

$30 \div 6 = \mathbf{5}$

50

MENTAL MATH/DIVISION PRACTICE

$540 \div 90 =$

$5{,}400 \div 90 =$

$54{,}000 \div 90 =$

$540{,}000 \div 90 =$

$60\overline{)480}$

$60\overline{)4{,}800}$

$60\overline{)48{,}000}$

$60\overline{)480{,}000}$

$480 \div 8 =$

$20{,}000 \div 40 =$

$6\overline{)360}$

$90\overline{)8{,}100}$

$640 \div 8 =$

$3{,}500 \div 50 =$

$60\overline{)42{,}000}$

$20\overline{)180{,}000}$

Name _____

Practicing Mental Math/Division

Complete the patterns.

300 ÷ 60 = _____	720 ÷ 80 = _____
3,000 ÷ 60 = _____	7,200 ÷ 80 = _____
30,000 ÷ 60 = _____	72,000 ÷ 80 = _____
300,000 ÷ 60 = _____	720,000 ÷ 80 = _____

$30\overline{)240}$	$70\overline{)490}$
$30\overline{)2{,}400}$	$70\overline{)4{,}900}$
$30\overline{)24{,}000}$	$70\overline{)49{,}000}$
$30\overline{)240{,}000}$	$70\overline{)490{,}000}$

1) Alex has 100 pieces of candy. There are 20 students in Alex's class. Alex wants to give each student an equal amount of candy. How many pieces of candy will each student get?

Use mental math to find the quotients.

1) 6,400 ÷ 80 = _____

2) 300 ÷ 60 = _____

3) 2,800 ÷ 7 = _____

4) 32,000 ÷ 40 = _____

5) 420 ÷ 60 = _____

6) 360 ÷ 9 = _____

7) 140,000 ÷ 20 = _____

8) 90,000 ÷ 30 = _____

9) 3,500 ÷ 50 = _____

10) 160 ÷ 4 = _____

11) $70\overline{)5{,}600}$

12) $8\overline{)2{,}400}$

13) $7\overline{)2{,}800}$

14) $90\overline{)5{,}400}$

15) $60\overline{)420}$

16) $60\overline{)360{,}000}$

17) $80\overline{)400}$

18) $4\overline{)280{,}000}$

Answer Key
Mult. and Div. - Obj.13

Patterns Practice

Ten Thousands	Thousands	Hundreds	Tens	Ones
				2
			2	0
		2	0	0
	2	0	0	0
2	0	0	0	0

Ten Thousands	Thousands	Hundreds	Tens	Ones
				5
			5	0
		5	0	0
	5	0	0	0
5	0	0	0	0

9	5
90	50
900	500
9,000	5,000
90.000	50,000

7	9
70	90
700	900
7,000	9,000
70,000	90,000

1) 600
2) 40
3) 80,000
4) 5
5) 700
6) 200
7) 7,000
8) 800
9) 40
10) 3,000
11) 40,000
12) 900
13) 5,000
14) 60

Practicing Mental Math/Division

5	9
50	90
500	900
5,000	9,000

8	7
80	70
800	700
8,000	7,000

1) 5 pieces of candy

1) 80	2) 5
3) 400	4) 800
5) 7	6) 40
7) 7,000	8) 3,000
9) 70	10) 40
11) 80	12) 300
13) 400	14) 60
15) 7	16) 6,000
17) 5	18) 70,000

Objective 14: Estimate and divide 2- and 3- digit numbers by 1-digit numbers with and without remainders. Use multiplication to check division.

Vocabulary

estimate/estimation
divisor
dividend
quotient
compatible
basic fact
closest
digit
remainder

Materials

base ten blocks
graph paper (optional)
calculators (optional)

Transparencies:

- Estimation
- Model - Problem 1
- Solution - Problem 1
- Model - Problem 2
- Solution - Problem 2
- Division Computation I
- Division Computation II
- Division Computation III
- Division Computation
- How to Check
- How to Check Division

Student Copies:

- Estimation Practice/Division
- More Estimation Practice/Division
- Model - Problem I
- Model - Problem 2
- Division with Base Ten Blocks
- Division Computation
- Division Delight
- How to Check Division
- Estimate! Divide! Check!
- Let's Divide
- Digit Detective
- Let's Write

Language Foundation

1. This lesson contains many examples of the *different kinds of problems encountered* when dividing 2- and 3-digit numbers by a single divisor. As a result this lesson is lengthy and will take more than a single class session to complete.

2. All of the vocabulary in this lesson has been previously taught. Some students might need to review.

3. Some students might not be familiar with mnemonic devices such as the one introduced to remember the division process. i.e. Does MacDonald's Sell Burgers? (division, multiplication, subtraction, bring down) Teachers can explain to students that these devices are things we use to help us remember steps or lists.

Mathematics Component

1. Estimate quotients with 1-digit divisors.
   - Display the transparency Estimation. Use a cover sheet so only the first problem ($4\overline{)13}$) shows.
   - Ask a student to read the problem. (13 divided by 4)
   - Tell students they are to find the estimated quotient using compatible numbers. Remind students that compatible numbers are numbers that get along (like friends) and are easy to work with mentally.
   - Ask students to find the basic division fact that is closest to $13 \div 4$. ($12 \div 4$)
   - On the transparency write, $4\overline{)12}$.
   - Ask students the quotient of $12 \div 4$. (3) Write 3 in the correct place.

$$4\overline{)13} \longrightarrow \overset{3}{4\overline{)12}}$$

   - Reinforce by pointing to the corresponding parts of the problem as you say, "I want to estimate $13 \div 4$. First I have to find the basic fact that is closest to $13 \div 4$. I need to find the number that can be evenly divided by 4 and is the closest to 13. It doesn't matter if the number is larger or smaller than 13. The closest basic fact is $12 \div 4$. The quotient of $12 \div 4$ is 3 so the estimated answer of $13 \div 4$ is 3."
   - Uncover problem #2, $7\overline{)27}$. Ask a student to read the problem out loud. (27 divided by 7)
   - Ask students what basic fact is closest to $27 \div 7$. ($28 \div 7$)
   - Ask students the quotient of $28 \div 7$. (4) Write $7\overline{)28}$ and the quotient (4) on the transparency.

$$7\overline{)27} \longrightarrow \overset{4}{7\overline{)28}}$$

   - Complete problems #3 and #4 in the same manner. Make sure students understand that the basic fact must be the closest number to the original dividend. It doesn't make any difference if the number is higher or lower.
   - Uncover problem #5, $4\overline{)54}$. Ask a student to read the problem out loud. (54 divided by 4)
   - Ask students what basic fact is closest to $54 \div 4$. Let students speculate. Some students might answer $48 \div 4$. Other students may not be able to see this relationship as they view basic facts as only going through the nines or tens table. For estimating division, basic facts through tens are sufficient. Tell the students that sometimes when the dividend is 2-digits, the basic fact can be found using just the first digit.
   - Cover the 4 in the dividend with your finger. Ask students the basic fact closest to $5 \div 4$. ($4 \div 4$)
   - Tell students since we are estimating and want to find numbers that are easy to divide mentally, the ones place automatically becomes zero, so the problem to be estimated is $40 \div 4$. Write on the transparency $4\overline{)40}$.
   - Ask students the quotient of $40 \div 4$. (10) Write 10 on the transparency.

$$4\overline{)54} \longrightarrow \overset{10}{4\overline{)40}}$$

- Uncover problem #6, $3\overline{)256}$. Tell students that the same method of estimation can be used with larger dividends with 3 digits.
- Ask a student to read the problem. (256 divided by 3)
- Cover up the 5 and 6 with your finger. Ask students if 2 can be divided by 3. (no) Tell students that the first 2 digits must be used since the first digit isn't large enough to be divided by the divisor.
- Cover up the 6 with your finger. Ask students what basic fact is closest to 25 ÷ 3. (24 ÷ 3)
- Tell students since we are estimating and want to find numbers that are easy to divide mentally, the ones place automatically becomes zero, so the problem to be estimated is 240 ÷ 3. Write on the transparency $3\overline{)240}$.
- Ask students the quotient of 240 ÷ 3. (80) Write 80 on the transparency.

$$3\overline{)256} \longrightarrow \begin{array}{r} 80 \\ 3\overline{)240} \end{array}$$

- Reinforce by pointing to the corresponding parts of the problem as you say, "I want to estimate 256 ÷ 3. First I look at the first digit. (2) Two can't be divided by 3 so I must use both the first and second digits. (25) I have to find the basic fact that is closest to 25 ÷ 3. The closest basic fact is 24 ÷ 3. Since I want to find numbers that are easy to divide mentally, the 6 becomes a zero. The estimated problem is 240 ÷ 3 which equals 80."
- Tell students that the actual answer will be around 80. The actual answer will have 2 digits, 1 digit in the tens place and 1 digit in the ones place.
- Uncover problem #7, $7\overline{)621}$. Have a student read the problem out loud. (621 divided by 7)
- Cover up the 2 and the 1 with your finger. Ask students if 6 can be divided by 7. (no)
- Ask students the next step. (Use the first 2 digits to find the basic fact.)
- Cover up the 1 with your finger. Ask students what basic fact is closest to 62 ÷ 7. (63 ÷ 7)
- Ask students what to do with the 1 in the ones place. (Change it to a zero.) Write on the transparency $7\overline{)630}$.
- Ask students the quotient of 630 ÷ 7. (90) Write 90 on the transparency.

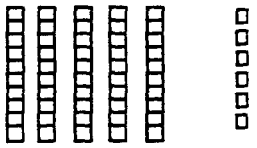
$$7\overline{)621} \longrightarrow \begin{array}{r} 90 \\ 7\overline{)630} \end{array}$$

- Ask students how many digits are in the answer. (2) Ask them what the place values of the answer are. (1 digit in tens place and 1 digit in ones place.)
- Problem #8 (18 ÷ 4) needs special attention. Two different basic facts (16 ÷ 4 and 20 ÷ 4) are acceptable for the estimation since 18 is in the middle of 16 and 20. Tell students that the ones place should not have any effect on the basic fact chosen. Make sure you give both answers for #8 (160 ÷ 4 = 40 and 200 ÷ 4 = 50). Tell students either answer is correct.
- Complete the rest of the problems on the transparency. Make sure students understand that the ones place will always be a zero when writing the estimated problem if there are more than 2 digits in the dividend. Have students tell you how many digits will be in the actual answer and the place

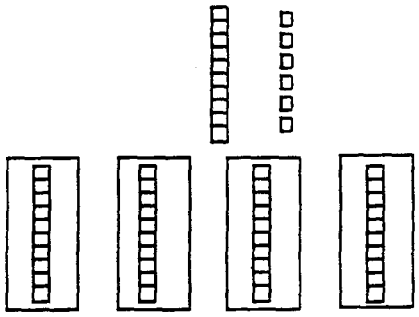
value of those digits. Make sure students are placing the quotient in the correct place value above the division bar.

- Distribute Estimation Practice/Division. Go over the example with students. You may want to complete the first 2 problems together before having the students complete the activity sheet independently.
- More Estimation Practice/Division is included for further reinforcement of the estimation concepts.

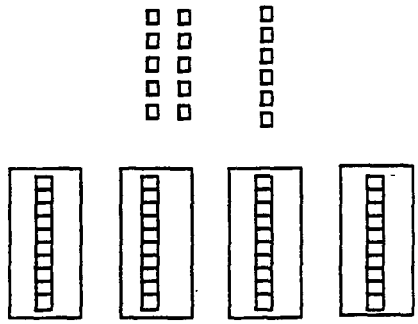
2. Use models to divide 2-digit and 3-digit numbers by 1-digit numbers.
   - Distribute base ten blocks to students. Have overhead base ten blocks ready for your use.
   - On the overhead, display the transparency Model - Problem 1. Give each student a copy of Model - Problem 1.
   - Ask a student to read the division problem. (56 divided by 4)
   - Tell students the first step is estimation. Estimation is important because it gives an approximate value of the quotient and more importantly, the estimation tells how many digits are in the quotient. Ask students to use compatible numbers (basic facts) to write the estimated problem. ($4\overline{)40}$) Write the estimated problem on the overhead as students write the problem on their papers.
   - Ask students the quotient of $40 \div 4$. (10) Write 10 on the transparency as students write 10 on their papers. Ask students how many digits will be in the quotient. (2)
   - Tell students to represent 56 with the base ten blocks. On the overhead, place 5 ten rods and 6 ones.



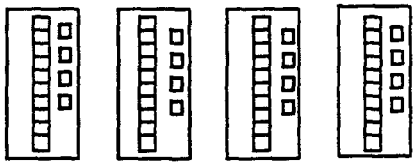
   - Ask students how many groups 56 is being divided into. (4) Point out the 4 rectangles at the bottom of the transparency that represent the 4 groups.
   - Tell students that 56 is shared equally among the 4 groups. The largest place value (in this problem tens is the largest place value) is shared or divided first. Ask students how many tens can be put in each of the 4 rectangles. (1 ten) Have students move 1 ten rod into each of the four rectangles as you do it on the overhead.



- Ask students how many ten rods are left over. (1) Ask students how they could regroup the leftover ten rod in order to divide it among the 4 rectangles. (Trade it for 10 ones.) On the overhead trade the ten rod for 10 ones as students do the same at their desks.

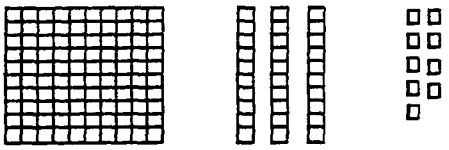


- Ask students how many ones they have now. (16) Tell students to place an equal number of the ones in each rectangle. After students complete this task at their desks, have a student volunteer do it on the overhead.

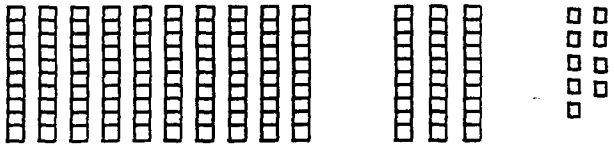


- Ask students how much is in each rectangle. (14) Say, "56 ÷ 4 = 14" as you write 14 on the transparency. Have the students write 14 on their papers.
- Display the transparency Solution - Problem 1. Point to each step on the transparency as you say, "56 ÷ 4 = 14. First the 5 tens are divided equally into 4 groups, 1 ten for each group. Then the remaining ten rod is traded for 10 ones, making 16 ones. The 16 ones are divided equally into the 4 groups, 4 ones for each group. There is 1 ten and 4 ones in each group for a total of 14 in each group. 56 ÷ 4 = 14."
- Ask students if this quotient, 14, agrees with the estimated quotient of 10. (Yes, 10 is close to 14 and there are 2 digits in both the estimate and the actual answer.)
- Have students clear the base ten blocks off the Model - Problem 1 sheet.
- Display the transparency Model - Problem 2. Distribute Model - Problem 2 to students.
- Ask a student to read the division problem. (139 divided by 3)
- Ask students what the first step is. (estimation)
- Ask students why estimation is important. (Estimation gives an approximate idea of the answer and tells how many digits are in the quotient.)
- Tell students to use compatible numbers (basic facts) to write the estimated problem. ($3\overline{)120}$) Write the estimated problem on the overhead as students write it on their papers.
- Ask students the quotient of 120 ÷ 3. (40) Write 40 on the transparency as students write 40 on their papers. Ask students how many digits will be in the quotient. (2)

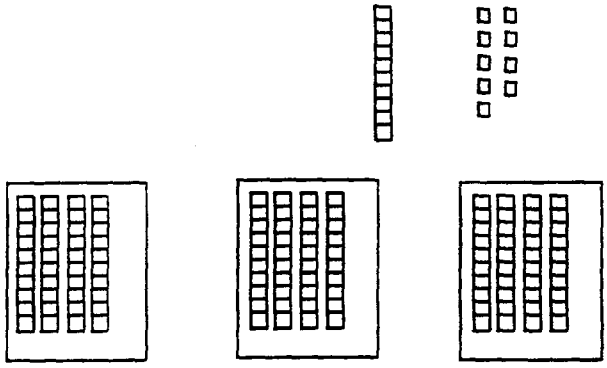
- Tell students to represent 139 with the base ten blocks. On the overhead, place 1 hundred flat, 3 ten rods, and 9 ones.



- Ask students how many groups 139 is being divided into. (3) Point out the 3 rectangles at the bottom of the transparency that represent the 3 groups.
- Tell students that 139 is being shared equally among the 3 groups. Tell students the largest place value (in this problem hundreds is the largest place value) is always shared or divided first. Ask students how many hundreds can be put in each of the 3 rectangles. (None, since there is only 1 hundred and there are 3 groups)
- Ask students how the 1 hundred can be regrouped so it can be shared or divided among the 3 groups. (Trade it for 10 ten rods.) On the overhead, trade the hundred flat for 10 ten rods as students do the same at their desks.

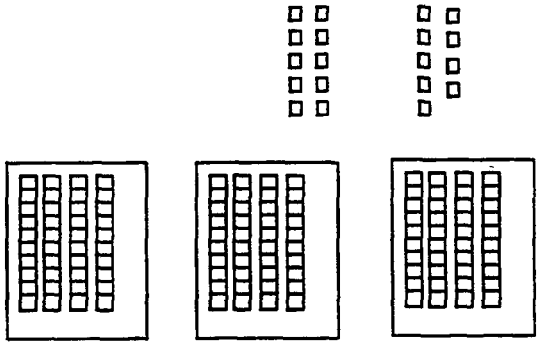


- Ask students how many tens they have now. (13) Tell students to place an equal number of tens in each rectangle. After students complete this task at their desks, have a student volunteer do it on the overhead.

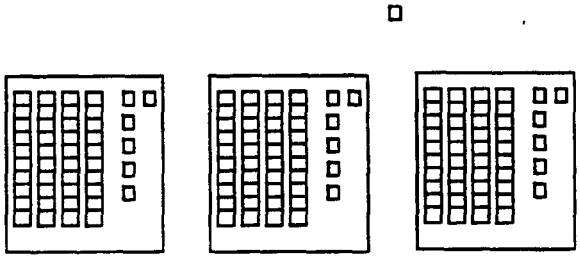


- Ask students how many tens are in each rectangle. (4) Ask students the value of those 4 tens. (40)

- Ask students how many ten rods are left over. (1) Ask students how the leftover ten rod can be regrouped so it can be shared or divided among the 3 rectangles. (Trade it for 10 ones.) On the overhead, trade the ten rod for 10 ones as the students do it at their desks.



- Ask students how many ones they have now. (19) Tell students to put an equal number of ones in each rectangle. After students complete this task at their desks, have a student volunteer do it on the overhead.

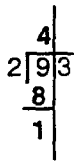


- Ask students how many ones are in each rectangle. (6) Ask students how many ones are left over. (1) Ask students what the leftover 1 is called. (remainder)
- Ask students how much is in each rectangle. (46) Ask students the quotient of 139 ÷ 3. (46 R 1) Make sure students do not forget to put the remainder in the quotient. Have students write the quotient on their papers as you write it on the transparency.
- Display the transparency Solution - Problem 2. Say to students as you retrace the steps using the transparency as a guide, "139 ÷ 3 = 46 R 1. Since there is only 1 hundred, you can't put a hundred into each group. The hundred flat is traded for 10 ten rods for a total of 13 tens. The 13 tens are divided equally into 3 groups, 4 tens for each group. The remaining ten rod is regrouped into 10 ones, making 19 ones. The 19 ones are divided equally into 3 groups, 6 ones for each group. There is 1 one left over. There are 4 tens and 6 ones in each group for a total of 46 in each group with a remainder of 1. 139 ÷ 3 = 46 R 1."
- Ask students if this quotient, 46 R 1, agrees with the estimated quotient of 40. (Yes, 46 is close to 40, and there are 2 digits in both the estimate and actual answer.)
- Do a few more examples with students. (247 ÷ 5; 431 ÷ 6; 322 ÷ 4; 246 ÷ 7) Work problems on overhead as students complete them at their desks. Have them write the problem, the estimated problem, and the estimated quotient first. Have students put the base ten blocks into groups on

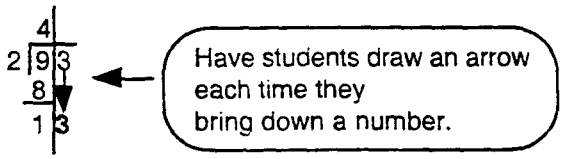
their desks. Some students might need rectangles to keep groups straight. Instead of drawing the rectangles, have small (3" by 4") pieces of paper available for students to use. Check each problem together as it is completed.

- Distribute Division with Base Ten Blocks. Go over example with students. Make sure students understand the symbols used to represent the base ten blocks. Have students use base ten blocks to complete the activity sheet.

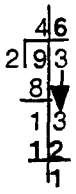
3. Use computation to solve division problems with 1-digit divisors.
   - Display the transparency Division Computation I. Use a cover sheet so only the first section ($2\overline{)93}$ and the rectangles next to the problem) is visible to students. Remind students that a line (▌) represents ten and a circle (●) represents one.
   - Say to students, "The problem is 93 divided by 2. The 9 tens and the 3 ones must be divided into 2 equal groups."
   - Uncover section #2 on the transparency. Use the transparency as a guide and write the numbers on the transparency (see diagram below) as you say to students, "I start with the tens since that is the largest place value. Four tens are put into each group. There is 1 ten left over. Write the 4 tens in the tens place in the answer. I used 2 groups of 4 tens which is 8 tens. 4 x 2 = 8. Write the 8 under the 9. I have 1 ten left over. Write the 1 under the 8."



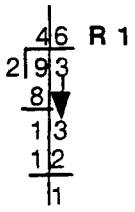
   - Uncover section #3 of the transparency. Use the transparency as a guide and write the numbers on the transparency (see diagram below) as you say to students, " I need to regroup the 1 leftover ten into 10 ones. Now I have a total of 13 ones. Write the 3 next to the 1 to represent the 13 ones."



- Uncover section #4 of the transparency. Use the transparency as a guide and write the numbers on the transparency (see diagram below) as you say to students, "Six ones are put in each group. Write the 6 ones in the ones place in the answer. I used 2 groups of 6 ones which is 12 ones. 6 x 2 = 12. Write the 12 ones under the 13. There is 1 one left over. Write the 1 under the 2."

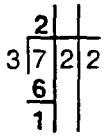


- Ask students what the leftover 1 is called. (remainder) Say to students as you write R 1 in the answer space on the transparency, "The leftover 1 is called the remainder. It is written in the quotient."

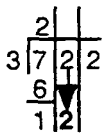


- Use the transparency to review the procedure . Emphasize the computation and the place value of the numbers.

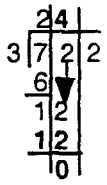
- Display the transparency Division Computation II. Use a cover sheet so only the first section (3⌈722 and the rectangles next to the problem) is visible to students. Ask students what the line (▌) represents. (ten) Ask students what the circle (●) represents. (one) Ask students what the square (□) represents. (hundred)
- Ask a student to read the problem. (722 divided by 3) Point to the symbols on the transparency as you say, "Seven hundreds, 2 tens and 2 ones are to be divided into 3 equal groups."
- Uncover section #2 of the transparency. Use the transparency as a guide and write the numbers on the transparency (see diagram below) as you say to students, "I start with the hundreds since that is the largest place value. There are 7 hundreds to be divided equally into 3 groups. Two hundreds can be put into each group. Write 2 in the hundreds place of the answer. Three groups of 2 each is 6. 2 x 3 = 6. Write the 6 under the 7. There is 1 hundred left over. Write the 1 under the 6."



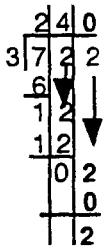
- Uncover section #3 of the transparency. Use the transparency as a guide and write on the transparency (see diagram below) as you say to students, "I need to regroup the 1 leftover hundred into tens. How many tens are in 1 hundred? (10) With the 10 tens from the 1 hundred and the 2 tens I already have, I now have a total of 12 tens. Write the 2 next to the 1 to represent the 12 tens. "



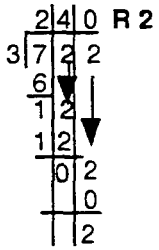
- Uncover section #4 of the transparency. Use the transparency as a guide and write on the transparency as you say to students, "There are 12 tens to be divided equally among the 3 groups. Four tens are placed in each group. Write 4 in the tens place of the answer. Three groups of 4 is 12. 4 x 3 = 12. Write 12 under the 12. There are no tens left over. Write 0 under the 2."



- Uncover section #5 of the transparency. Use the transparency as a guide and write on the transparency as you say to students, "There are 2 ones left. Write 2 next to the 0. I can't divide the 2 ones into 3 groups. There are zero ones in the answer. Write 0 in the ones place in the answer. Three groups of 0 is 0. 0 x 3 = 0. Write 0 under the 2. There are 2 ones left over. Write 2 under the 0 in the ones place."

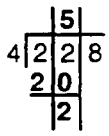


- Ask students what the leftover 2 is called. (remainder) Ask students how to write the remainder . (R 2) Write R 2 in the quotient.

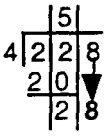


- Use the transparency to review the procedure. Emphasize the computation and the place value.

- Display the transparency Division Computation III. Use a cover sheet so only section #1 is visible to students.
- Ask a student to read the problem. (228 divided by 4) Point to the symbols on the transparency as you say, "Two hundreds, 2 tens and 8 ones are to be divided into 4 equal groups."
- Use the transparency as a guide as you say to students, "I start with the hundreds since that is the largest place value. Since there are only 2 hundreds, I don't have enough hundreds to put 1 hundred in each of the 4 groups. What can I do with the hundreds so I can put them into the groups of 4?" (Regroup the hundreds into tens.)
- Uncover section #2 of the transparency. Use the transparency as a guide as you say to students, "Each hundred was regrouped into 10 tens. Since I had 2 hundreds, I have 2 sets of 10 tens which equals 20 tens or 200. I already had 2 tens so now I have a total of 22 tens. If I divide the 22 tens equally among the 4 groups, how many tens will be in each group?" (5)
- Uncover section #3 of the transparency. Point out to students how 5 tens are now in each group of 4. Ask students where in the quotient the 5 should be written. (above the 2 in the tens place) If needed, remind them that the 5 stands for 5 tens. Write 5 in the quotient.
- Ask students how many tens were used? (20) Point to the numbers in the problem as you say, "Four groups of 5 tens equals 20 tens. 5 x 4 = 20. Write 20 under 22 in the problem. I have 2 tens left over. Write 2 under the 0." Point out to students that 22 - 20 = 2.

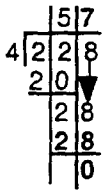


- Ask students how many tens are left. (2) Ask students how those tens can be used. (Regroup the tens into ones.) Ask students how many ones are in the 2 tens. (2 sets of 10 ones or 20 ones)
- Uncover section #4 of the transparency. Point out to students that the 2 tens are regrouped into 20 ones. Ask students how many total ones there are. (28) Ask students what can be written in the problem to show there are 28 ones. (Write the 8 ones next to the 2 tens.) Write 8 in problem next to the 2.



- Ask students how many ones there are. (28) Asks students how many ones can be put into each of the 4 groups. (7)

- Uncover section #5 of the transparency. Point out to students the 7 ones that are in each of the 4 groups. Ask students where the 7 ones should be written in the quotient. (over the 8 in the ones column) Write 7 in the quotient over the 8.
- Ask students how many ones were used. (28) Point to the numbers in the problem as you say, "Four groups of 7 ones in each group equals 28. 7 x 4 = 28." Ask students where to write 28 in the problem. (Directly under the 28 already written) Write 28 in the problem. Ask students how many ones are left over. (0) Ask students where to write the 0 in the problem. (Under the 8 in the ones column) Write 0 in the problem.



- Ask students if there is a remainder in this problem. (no) Tell students if there is no remainder it is not necessary to write R 0.
- Use the transparency to review the procedure. Emphasize the place value and computation.

- Display the transparency Division Computation. Go over the transparency with students. Emphasize the sequence of the computation - divide, multiply, subtract, and bring down. The class might want to make up a saying to help them remember the sequence of operations. (Examples: **D**oes **M**acDonald's **S**ell **B**urgers? or **D**oes **M**other **S**pend **B**illions?) Give students a copy of Division Computation to use for reference.
- Do a few more examples with students. (94 ÷ 6; 123 ÷ 8; 479 ÷ 5; 347 ÷ 7) Have students do one problem at a time. To separate the place values have students draw lines in their problems, use graph paper, or turn lined notebook paper so the lines are vertical. If needed, they may use symbols or base ten blocks to help them figure out the correct placement of the numbers in the computation. Check work together by doing each problem on the overhead.
- Distribute Division Delight. Go over the example with students. Remind them to estimate first to know the number of digits in the quotient. If students have difficulty with the computation, allow them to use base ten blocks or draw the symbols representing the base ten blocks.

4. Use multiplication to check division.
   - Ask students what the inverse operation is of division. (multiplication) Tell students multiplication can be used to check a division problem to make sure the answer is correct.
   - Display the transparency Checking Division.
   - Use a cover sheet so only the first line is visible to students. Have a student read the 2 problems. (16 ÷ 8 = 2; 2 x 8 = 16)

- Continue in this manner until all the problems have been read. Ask students if they see a pattern between the multiplication problems and the division problems. (The last two numbers (the quotient and the divisor) in the division problem are multiplied together to get the first number (dividend) in the division problem.)
- Tell students that to check a division problem, the quotient is multiplied by the divisor. If the product is the same as the dividend, then the division problem is correct.
- Display the problem $5\overline{)17}$. Work with students to solve the problem. (3 R 2)
- Ask students how to check the answer to make sure it is correct. (Multiply 3 x 5 which equals 15.) Ask students if 15 is the same as the dividend. (No, the dividend is 17.) Let students speculate what to do with the remainder when checking a division problem with multiplication. If no one discovers the correct answer, tell them the remainder must be added to the product. The sum of the product and the remainder will equal the dividend. (15 + 2 = 17)
- Complete the remaining 2 problems on the transparency and check each problem using multiplication.
- Display transparency How to Check Division. Go over the examples of checking a division problem by using multiplication. Emphasize the adding of the remainder. Give students a copy of How to Check Division to use for reference.

Note: Calculators may also be used for checking. Students need to understand the procedure for checking (multiplying the quotient by the divisor and then adding the remainder) but the choice of manual computation or calculators is up to the teacher.

- Distribute Estimate! Divide! Check! Go over the example with students. Have students complete the activity sheet independently. If students have difficulty with the division computation, allow the use of base ten blocks or symbols; however, make sure they write the computation steps and not just the quotient. Calculator use for checking is up to the discretion of the teacher.
- Let's Divide, Digit Detective and Let's Write are included for further practice.

ESTIMATION

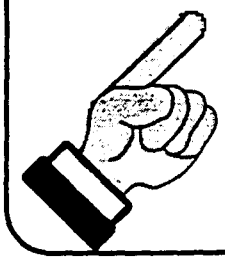
① $4\overline{)13}$ → ⌐	⑥ $3\overline{)256}$ → ⌐
② $7\overline{)27}$ → ⌐	⑦ $7\overline{)621}$ → ⌐
③ $5\overline{)37}$ → ⌐	⑧ $4\overline{)181}$ → ⌐
④ $6\overline{)34}$ → ⌐	⑨ $9\overline{)389}$ → ⌐
⑤ $4\overline{)54}$ → ⌐	⑩ $8\overline{)555}$ → ⌐

Name _____

ESTIMATION PRACTICE/DIVISION

Estimate the quotient. $6\overline{)578}$

Look at the first digit. You can't divide 5 by 6. $6\overline{)5}$



Look at the first 2 digits. $6\overline{)57}$

Find the basic fact closest to 57 ÷ 6. $6\overline{)54}$

Ones place in dividend becomes zero. $6\overline{)540}$

Use mental math to find estimate. $\begin{array}{r}90\\6\overline{)540}\end{array}$

Estimate the quotients.

1) $5\overline{)148}$ → ⌐‾‾

2) $4\overline{)93}$ → ⌐‾‾

3) $9\overline{)252}$ → ⌐‾‾

4) $6\overline{)389}$ → ⌐‾‾

5) $2\overline{)64}$ → ⌐‾‾

6) $7\overline{)843}$ → ⌐‾‾

7) $9\overline{)79}$ → ⌐‾‾

8) $8\overline{)642}$ → ⌐‾‾

9) $3\overline{)127}$ → ⌐‾‾

10) $2\overline{)588}$ → ⌐‾‾

11) $5\overline{)115}$ → ⌐‾‾

12) $7\overline{)65}$ → ⌐‾‾

13) Circle the pair of **compatible** numbers for **26 ÷ 6**.

25 ÷ 6 24 ÷ 6 28 ÷ 6 30 ÷ 6

14) Circle the pair of **compatible** numbers for **789 ÷ 9**.

800 ÷ 9 900 ÷ 9 81 ÷ 9 810 ÷ 9

15) Circle the pair of **compatible** numbers for **654 ÷ 3**.

650 ÷ 3 600 ÷ 3 900÷ 3 60 ÷ 3

16) Circle the pair of **compatible** numbers for **19 ÷ 4**.

20 ÷ 5 16 ÷ 4 18 ÷ 4 20 ÷ 4

Circle the **best estimate** for the following problems.

17)	208 ÷ 7	A. 3	B. 20	C. 30	D. 23
18)	67 ÷ 8	A. 10	B. 8	C. 9	D. 10
19)	98 ÷ 4	A. 40	B. 30	C. 2	D. 20
20)	443 ÷ 5	A. 90	B. 80	C. 9	D. 8

21) How many digits are in the quotient?	22) How many digits are in the quotient?
$6\overline{)468}$	$3\overline{)287}$
____ digits	____ digits

Name _____

MORE ESTIMATION PRACTICE/DIVISION

Estimate the quotients.

1) $4\overline{)281}$ → ⌐‾‾

2) $8\overline{)74}$ → ⌐‾‾

3) $6\overline{)285}$ → ⌐‾‾

4) $9\overline{)214}$ → ⌐‾‾

5) $5\overline{)613}$ → ⌐‾‾

6) $7\overline{)51}$ → ⌐‾‾

7) $2\overline{)85}$ → ⌐‾‾

8) $3\overline{)145}$ → ⌐‾‾

9) $8\overline{)30}$ → ⌐‾‾

10) $6\overline{)510}$ → ⌐‾‾

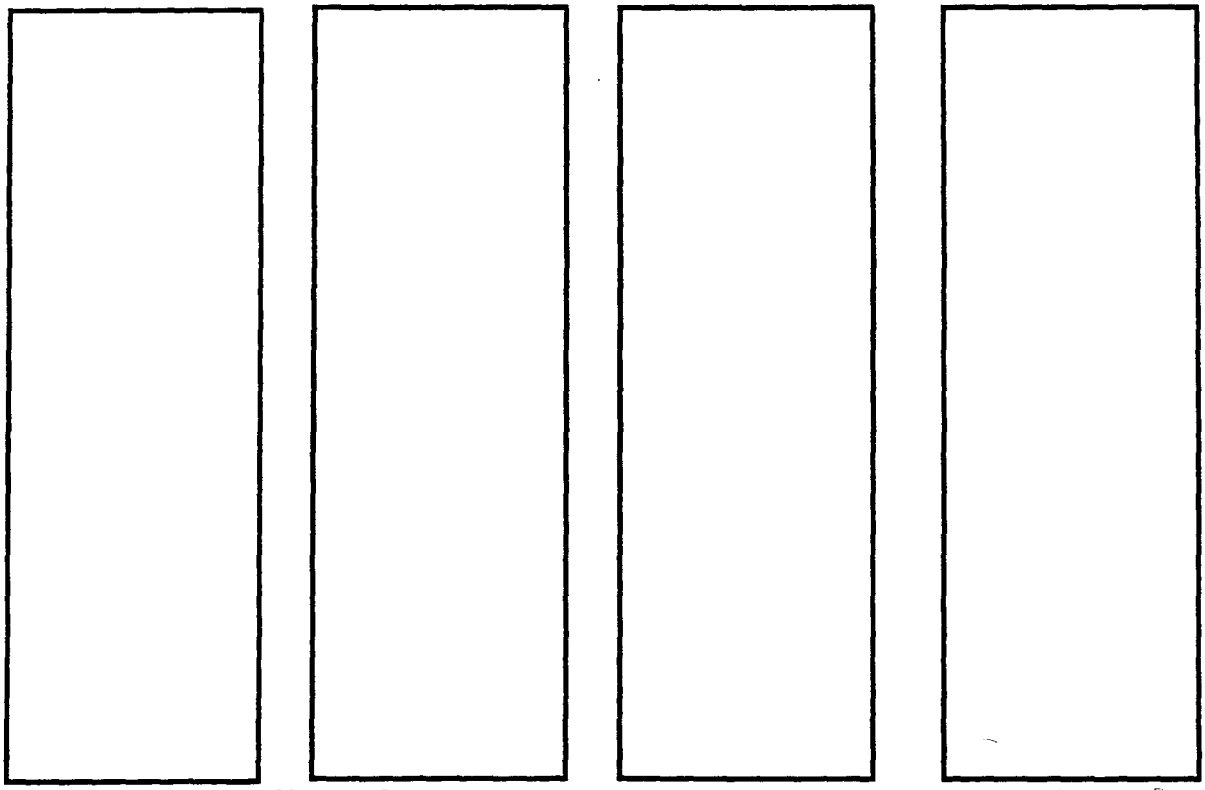
11) A total of **34** students are going to the concert. If each car holds **5** students, **about** how many cars are needed?

12) If one can of paint covers **8** square feet, **about** how many cans of paint will be needed to cover **70** square feet?

Model - Problem 1

$4\overline{)56}$ →

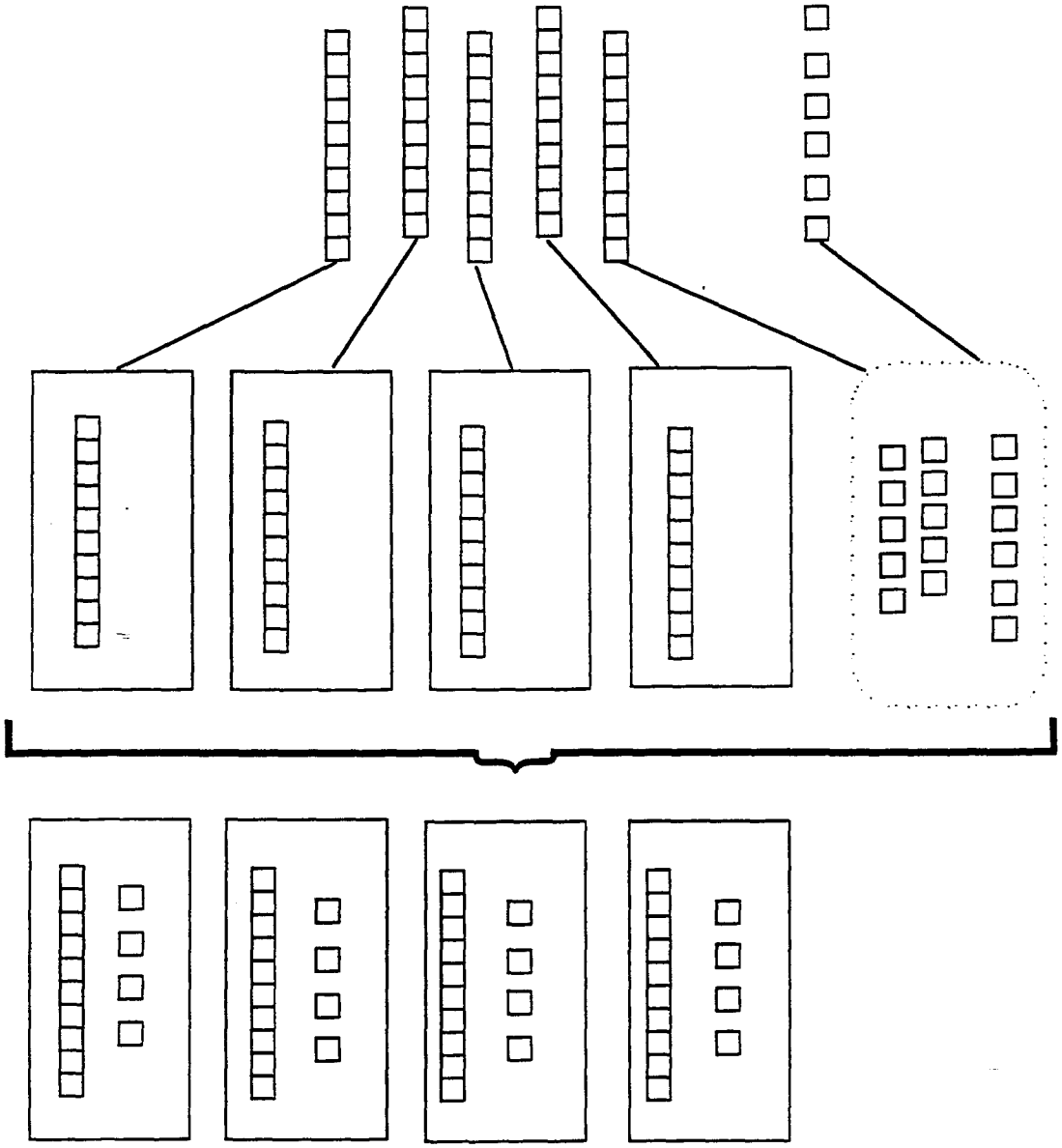
Transparency/
Student Copy



Solution - Problem 1

Transparency

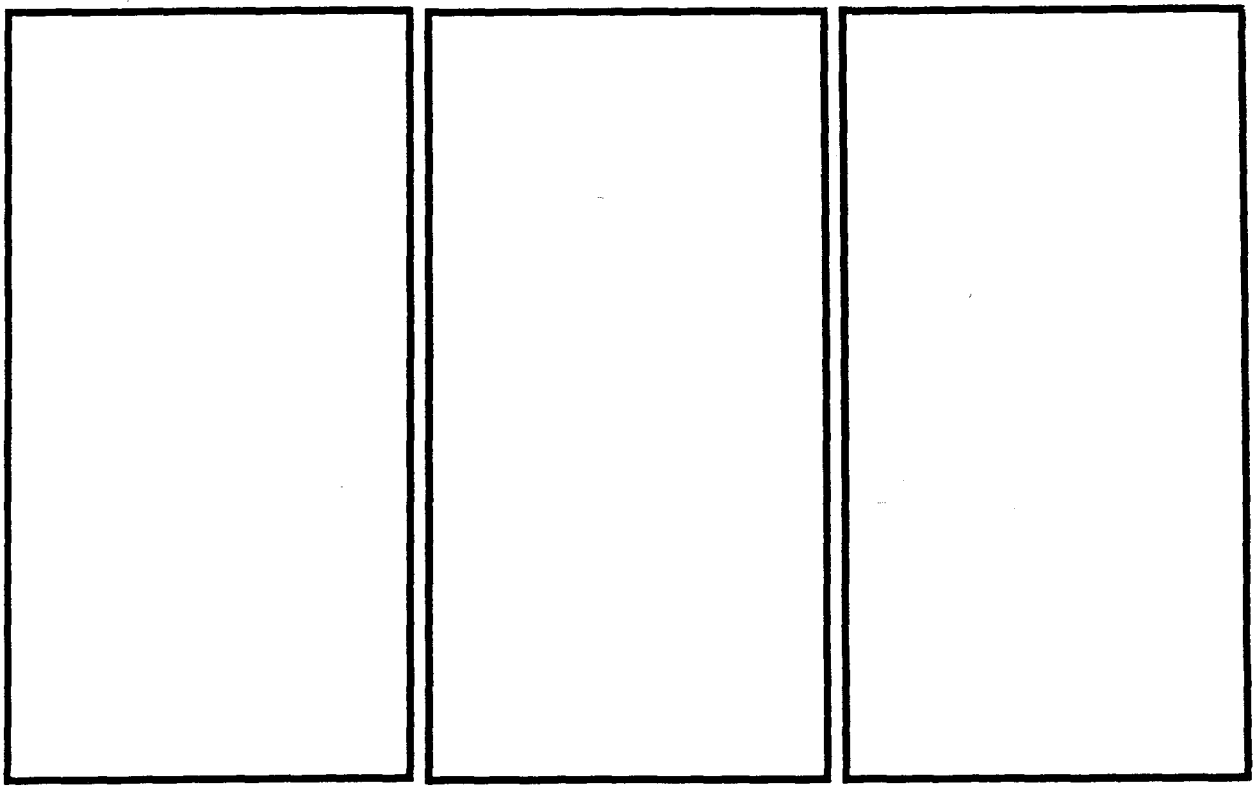
$$4\overline{)56} = 14 \longrightarrow 4\overline{)40} = 10$$



Model - Problem 2

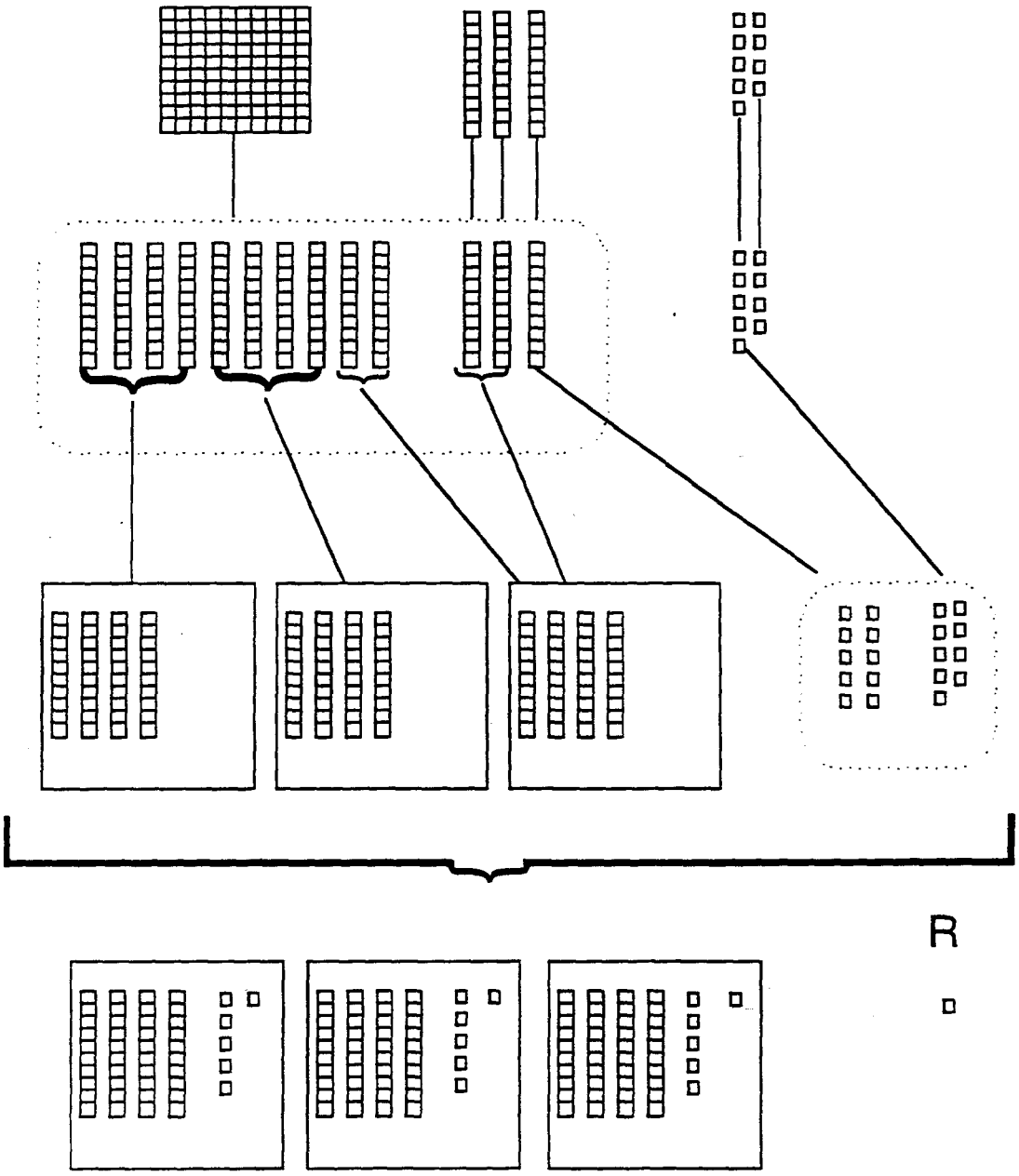
$3\overline{)139}$ →

Transparency/
Student Copy



Solution - Problem 2

$$3\overline{)139}\ \text{46 R 1} \quad \longrightarrow \quad 3\overline{)120}\ \text{40}$$

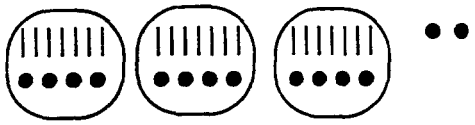


Name _____

Division with Base Ten Blocks

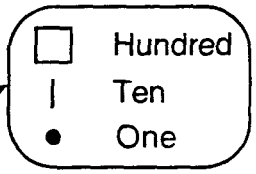
EXAMPLE

→ $3\overline{)224}$ 74 R 2 → $3\overline{)210}$ 70



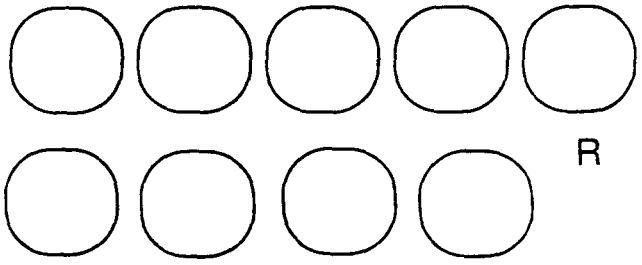
R ● ●

1. Estimate the quotient.
2. Use base ten blocks to find each quotient.
3. Draw the quotient. Use these symbols.



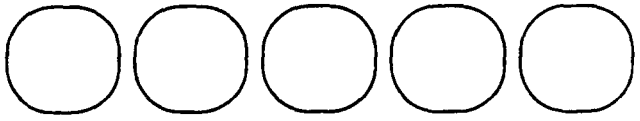
_____ 4. Write quotient in original problem.

1) $9\overline{)98}$ → ⌐



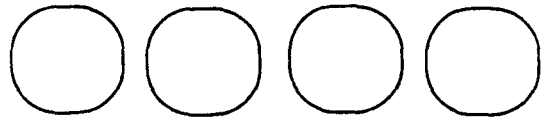
R

2) $5\overline{)218}$ → ⌐



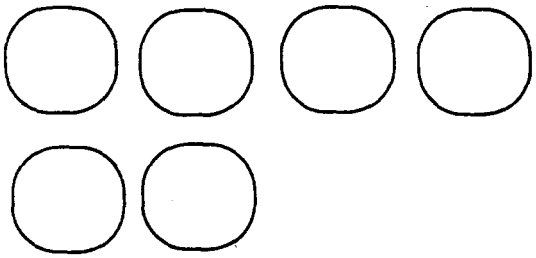
R

3) $4\overline{)86}$ → ⌐



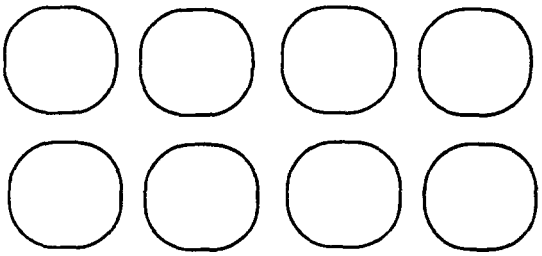
R

4) $6\overline{)323}$ → ⌐



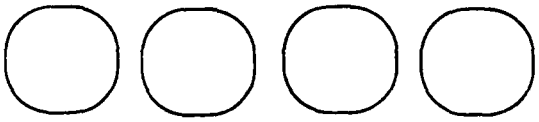
R

5) $8\overline{)673}$ → ⌐



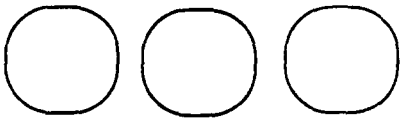
R

6) $4\overline{)292}$ → ⌐



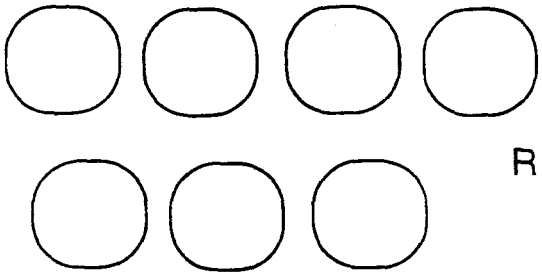
R

7) $3\overline{)416}$ → ⌐



R

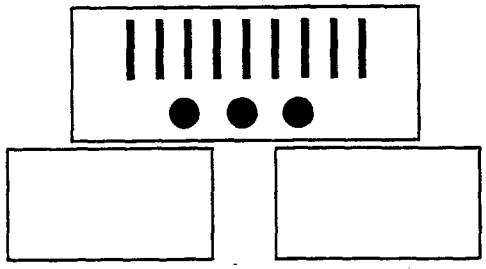
8) $7\overline{)527}$ → ⌐



R

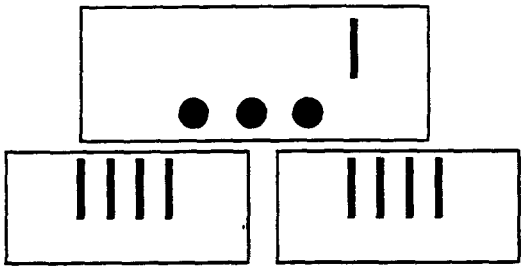
Division Computation I

① $2\overline{)93}$



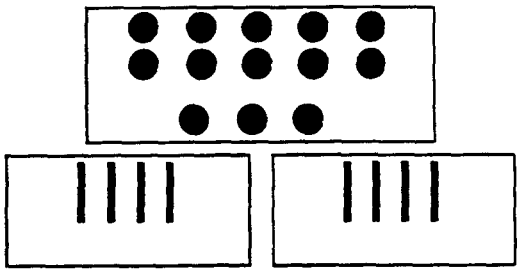
② Tens Ones

$2\overline{)93}$



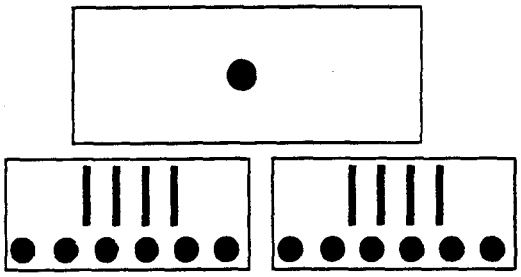
③ Tens Ones

$$\begin{array}{r} 4 \\ 2\overline{)93} \\ 8 \\ \hline 1 \end{array}$$



④ Tens Ones

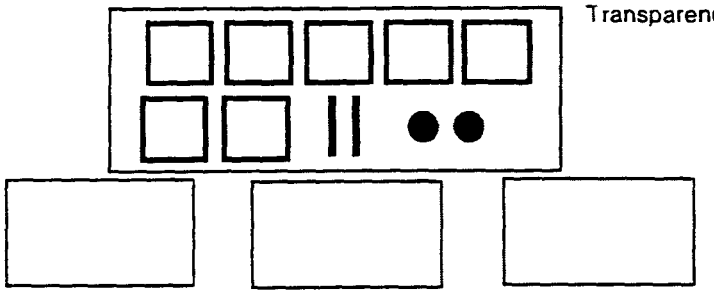
$$\begin{array}{r} 4 \\ 2\overline{)93} \\ 8\downarrow \\ \hline 13 \\ \hline \end{array}$$



Division Computation II

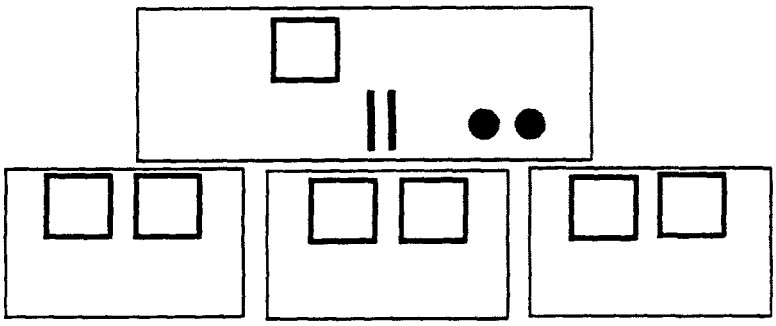
Transparency

① $3\overline{)722}$



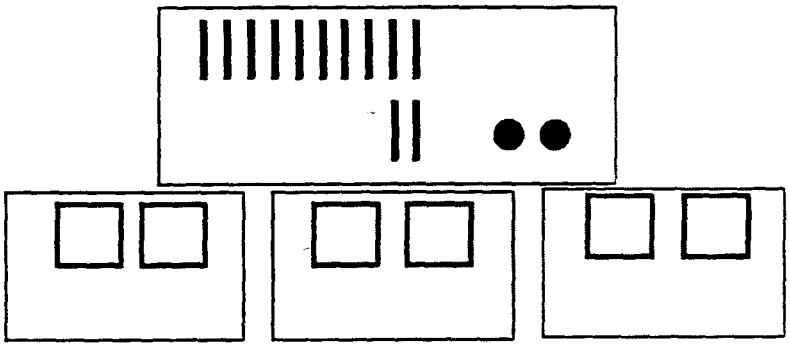
② Hundreds Tens Ones

$3\overline{)722}$



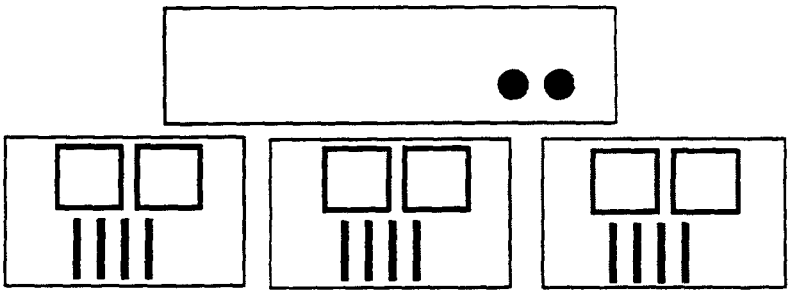
③

$$\begin{array}{r} 2 \\ 3\overline{)722} \\ 6 \\ \hline 1 \end{array}$$



④

$$\begin{array}{r} 2 \\ 3\overline{)722} \\ 6\downarrow \\ \hline 12 \end{array}$$



⑤

$$\begin{array}{r} 24 \\ 3\overline{)722} \\ 6\downarrow \\ \hline 12\downarrow \\ 12\downarrow \\ \hline 0 \end{array}$$